

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

In Re the Application of	:	
Applicant: Melvin Auerbach	:	Declaration of Melvin Auerbach
Serial No.: 09/ 757,614	:	In Support of Antedating the
Filed: January 11, 2001	:	Koizumi Reference (US. #6,491,992B1)
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Rule 131 Declaration

1. I do hereby declare that I am of full age, that I am the applicant in the above identified Application and am fully familiar with the facts and circumstances pertaining to the conception and reduction to practice of the invention claimed in the Application.

2. It was between October of 1997 and January of 1998 that I conceived the concept of utilizing Exxpro- and a cross-linking agent such as divalent metal salts and divalent metal acid salts to prepare the sealing strip compositions of my invention. I became aware of this product and the chemistry involved at an Insulating Glass trade show. Further discussions with various technical people and perusal of the literature determined that this cross-linking reaction went by an ionic mechanism as opposed to a free radical mechanism. This was desirable because the reaction would be slower and therefore more controllable, leading to sealing strip compositions with enhanced and selective physical properties. I had years of prior experience in this field and had a good idea as to what materials would be needed to complement the new Exxpro rubber to make a product that could be used as an insulating glass sealant.

3. On or about January 19, 1998, I procured Technical Data Sheets and Material Safety Data Sheets (MSDS) for Amoco Polybutene (an isobutylene/butene liquid copolymer) which I was going to use in my sealing strip composition. See Exhibit 1.

4. On or about January 19, 1998, I procured Technical Data Sheets and Material Safety Data Sheets from Chevron for acetylene carbon black that I was going to use in my sealing strip composition. See Exhibit 2

5. On or about January 20, 1998, I received from Exxon Chemical Company data sheets on several of the Escorez (C-5 hydrocarbon resins) tackifying resins for use in my sealant composition. Tom Nitkowski of Exxon and I had prior discussions relating to my use of these materials resulting in Tom sending me the resins. See Exhibit 3.

6. On July 10, 1998, I had a meeting at Akron Rubber Development Laboratory, Inc. (ARDL), a testing laboratory facility, to discuss procedures that I would require for making my sealant composition and testing its properties. I discussed the use of carbon blacks, oils, tackifiers, desiccants, silanes, zinc salts, butyl rubber and Exxpro- as part of the formulation, as well as pressures, temperatures and other reaction variables in connection with the preparation of my composition. See Exhibit 4 representing my notes of that meeting. I believe I should qualify the meaning of the term "masterbatch" and "batch" as it pertains to my research procedures and hence to this discovery. The term masterbatch refers to a mixture of rubbers, carbon black and oils, which is prepared separately on a Banbury type mixer. A batch of the final product is made in a double arm sigma mixer by adding the masterbatch and subsequently the remainder of the raw materials as mentioned above.

7. On July 14, 1998, I had a telephone discussion with Ken McElrath of Exxon on additional aspects of the chemistry of my invention in relation to Exxpro- See Exhibit 5 representing my notes of that discussion.

8. On July 14, 1998 I received a faxed quotation from ARDL on various costs associated with the project. See Exhibit 6 attached hereto.

9. On or about July 16, 1998, I received a fax from Ken McElrath of Exxon supplying cure rate data for Exxpro-. See Exhibit 7 attached hereto.

10. On or about July 29, 1998, I received information and a Material Safety Data Sheet (MSDS) for silanes from Witco. See Exhibit 8 attached hereto.

11. On or about July 31, 1998, ARDL received samples and data from UOP (on my behalf) on molecular sieves. See Exhibit 9 attached hereto.

12. On or about August 12, 1998, I received an internal memo from ARDL for rubber mixing. See Exhibit 10 attached hereto.

13. On or about August 18, 1998, I received an internal ARDL memo regarding the initial masterbatch to be made at ARDL. See Exhibit 11 attached hereto.

14. On September 10, 1998, I initiated the first lab experiments to determine a general procedure for making the product of my invention using butyl rubber, tackifiers and adhesion promoters (along with other ingredients) per claims 13 and 26. See Exhibit 12 attached hereto representing my notes of the materials and parameters used. It should be noted that this formulation and procedure was based on my prior experience and expertise in this field. When I began the project I started with what I knew from prior knowledge and built upon this knowledge with each experiment and the results obtained.

This would relate not only to the type of ingredients used but also to quantities and mixing parameters

15. On September 22, 1998, ARDL prepared a masterbatch for my invention. Attached, as Exhibit 13 is an interdepartmental memo.

16. Exhibit 14 attached, dated September 29, 1998, and represents an ARDL internal costing of the work done for me.

17. The memo to me from ARDL dated September 29, 1998 reflects ARDL initial test results of the masterbatch. See Exhibit 15 attached hereto.
18. Exhibit 16 reflects further ARDL test results on October 14, 1998.
19. Exhibit 17 reflects further ARDL test results on October 20, 1998.
20. Exhibit 18, dated October 28, 1998, reflects further ARDL test results and questions from ARDL.
21. Exhibit 19, dated November 1, 1998, represents an ARDL internal costing of work done by ARDL for me in connection with my sealing strip.
22. Exhibit 20 represents my formulation sent to ARDL on November 6, 1998 using Exxpro- with zinc oxide.
23. Exhibit 21 represents the same formulation as Exhibit 20, sent to ARDL on November 6, 1998, with my handwritten notes.
24. Exhibits 22 through 29 represent test results from ARDL between November 6, 1998 and December 30, 1998.
25. On January 8, 1999, I sent a memo to ARDL requesting the raw materials and quantities needed to make two batches of my invention. See Exhibit 30 attached hereto.
26. On January 11, 1999, I received an ARDL memo concerning raw materials needed for my batch , comprising in part Exxpro masterbatch tackifiers, oils, desiccant, carbon black and zinc oxide. See Exhibit 31 attached hereto.

27. On January 11, 1999 a note from ARDL advising quantities of raw materials available. See attached Exhibit 32.
28. On January 19, 1999 test results were received from ARDL. See Exhibit 33 attached hereto.
29. Exhibits 34 and 35 dated January 19, 1999, relate to formulae sent by me to ARDL for the first three experiments (Exhibit 35 is Exhibit 34 with ARDL notes added). Also attached to Exhibit 35 are ARDL test results. This is the first example of the use of Exxpro, tackifiers and silane as per claims 13 and 26. In addition it also shows the use of carbon black, desiccant and zinc oxide.
30. On January 19, 1999, the batch formulated represented the first use of zinc stearate in addition to those ingredients specified in Exhibit 35. See Exhibit 36 attached hereto.
31. Exhibit 37 dated January 28, 1999, reflects ARDL test results for the first three batches.
32. On or about January 29, 1999, I received an itemized bill from ARDL representing the work they had done for me. See Exhibit 38 attached hereto.
33. Exhibits 39 through 42 (for period from 1-29-99 to 3-23-99) reflect test results for various masterbatches and batches of my invention.
34. Exhibit 43 represents an ARDL note on a remix.
35. Exhibits 44 through 47 (for period from 4-8-99 to 4-22-99) represent test results for various batches of my invention.
36. On May 15, 1999, I met with ARDL to discuss my product. Exhibit 48 reflects my notes of that meeting. Note zinc octoate as a cross-linking agent is indicated.

37. The formulations of various batches are set forth by me in Exhibit 49, which is a memo to ARDL dated May 20, 1999. Note that all ingredients are included (with reference to my claims 13 and 26), except zinc octoate and polyisobutylene.

38. Exhibits 50 and 51 represent ARDL invoicing for work done on my invention. Exhibit 50 of 5/20/99 is an internal estimate whereas Exhibit 51 of 5/21/99 is an actual invoice.

39. On June 8, 1999, I received a fax from Exxon regarding product specification of Exxpro- 8433 and Vistanex MM L-80 (polyisobutylene) See Exhibit 52 attached hereto.

40. Exhibit 53, received June 8, 1999, is a product specification memo from Exxon on polyisobutylene.

41. Exhibit 54, dated June 10, 1999, is a formulation memo for scale up to be run by Adhesive Consultants. All the claimed compositions are included except polyisobutylene as per Claims 13 and .

42. The tables set forth in Exhibits 55 through 57 represent many batches of differing compositions and concentrations of my invention. Test results are summarized. In particular, note Batch 627 run on June 22, 1999, containing all the compositions used as per claims 13 and 26. It uses the Exxpro rubber (brominated olefin terpolymer), polyisobutylene, zinc octoate (cross linking agent), silane (adhesion promotor) and a tackifier

43. Additional experiments redundant to the above were continually run between June 22, 1999 and January 11, 2001, the filing date of the subject Application. These and additional experiments were continuously carried out to optimize the individual ingredients and their respective quantities to

attain the optimum physical properties of the final product.

44. Conception and reduction to practice of my claimed invention, as presently pending before the USPTO, was accomplished prior to October 19, 1999, the Effective Date of the Koizumi et al reference (US 6,491,992B1) and as such, I respectfully request that the reference be removed from consideration.

45. Moreover, the Koizumi et al claims do not disclose my claimed invention and as such, this Section 132 Affidavit is appropriate.

46. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both under Section 1001 of title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.


MELVIN AUERBACH

Dated:

July 21, 2003

Amoco® polybutenes are a family of viscous, non-drying liquid polymers. They are colorless, virtually odorless, chemically stable and resist oxidation by light and moderate heat. Their unique characteristics can be used to enhance and improve the performance properties of a wide variety of end-products in many different industries.

The demand and uses for polybutenes continue to evolve as new applications are introduced and existing product lines are improved. Some of these applications include adhesives, binders for herbicides and pesticides, caulks, coatings, dust suppressants, electrical, lubricants, personal care products, and sealants, among others.

As the world's leading polybutene marketer, Amoco offers a technically trained, professional sales and research staff to work with you to provide the sales and technical support you need to assist in the development of your polybutene application.

Properties of Amoco Polybutene

Specifications	L-14 ^{1,2}	L-80 ¹	L-85 ²	L-100 ¹
Viscosity, Kinematic, ASTM D445 at 38°C (100°F), cSt at 99°C (210°F), cSt	27-33 —	108-112 —	118-128 —	210-227 —
Flash point, °C (°F), min. Cleveland open cup, ASTM D92 Pensky-Martens closed cup, ASTM D93	138 (280) —	138 (280) —	148 (300) —	141 (285) —
Specific gravity, at 15.5°C (60°F) ASTM D1298	.830-.845	.845-.860	.845-.860	.850-.865
Color, APHA, max. Photometric, haze-free	70	70	70	70
Haze, Photometric, max.	15	15	15	15
Appearance (all grades)	clear	clear	clear	clear

¹Blends
²Straight run

Non-specification Properties

Viscosity, Brookfield, ASTM D4402 at 38°C (100°F), cP at 99°C (210°F), cP	25 —	90 —	125 —	183 —
Viscosity, Saybolt Universal, ASTM D2161 at 38°C (100°F), SUS at 99°C (210°F), SUS	139 42	504 64	576 59	1,005 88
Molecular weight, number average gel permeation chromatography, M _n	370	455	435	510
Viscosity index, ASTM D2270	20	85	55	70
Pour point, °C (°F), ASTM D97	-51 (-60)	-40 (-40)	-38 (-33)	-35 (-30)
Density, lb/gal, ASTM D1298	6.97	7.08	7.10	7.14
Refractive index, N _D ²⁰ , ASTM D1218	1.4680	1.4758	1.4735	1.4780
Neutralization number, mg KOH/g, ASTM D974	0.02	0.02	0.02	0.02
Total sulfur, X-ray analysis, ppm	< 5	< 5	< 5	< 5
Evaporation loss, 10 hr at 99°C (210°F), wt %, ASTM D972	12	5	5	6

Amoco polybutenes, as manufactured, comply with the following FDA regulations:
Title 21, CFR 177.1430 Polybutylene-butene copolymers used in food contact surfaces
Title 21, CFR 178.3670 Lubricants with incidental food contact
Title 21, CFR 178.3910 Surface lubricants used in the manufacture of metallic articles used in food contact

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Flash point, °C (°F), min. Cleveland open cup, ASTM D92 Pensky-Martens closed cup, ASTM D93	138 (280) —	138 (280) —	148 (300) —	141 (285) —
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Color, APHA, max. Photometric, haze-free	70	70	70	70
Haze, Photometric, max.	15	15	15	15
Appearance (all grades)	clear	clear	clear	clear

¹Hard
²Stamps run

Non-specification Properties

Viscosity, Brookfield, ASTM D4402 at 38°C (100°F), cP at 99°C (210°F), cP	25 —	90 —	125 —	193 —
Viscosity, Saybolt Universal, ASTM D2161 at 38°C (100°F), SUS at 99°C (210°F), SUS	139 42	504 64	576 59	1,005 88
Molecular weight, number average gel permeation chromatography, M _n	370	455	435	510
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Pour point, °C (°F), ASTM D97	-51 (-60)	-40 (-40)	-38 (-33)	-35 (-30)
Density, lb/gal, ASTM D1298	8.97	7.08	7.10	7.14
Refractive index, N _D ²⁰ , ASTM D1218	1.4880	1.4758	1.4735	1.4780
Neutralization number, mg KOH/g, ASTM D974	0.02	0.02	0.02	0.02
Total sulfur, X-ray analysis, ppm	< 5	< 5	< 5	< 5
Evaporation loss, 10 hr at 99°C (210°F), wt %, ASTM D972	12	6	5	6

Amoco polybutenes, as manufactured, comply with the following FDA regulations:
Title 21, CFR 177.1430 Isobutylene-butene copolymers used in food contact surfaces
Title 21, CFR 178.3570 Lubricants with incidental food contact
Title 21, CFR 178.3510 Surface lubricants used in the manufacture of metallic articles used in food contact

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Specifications	L-14 ^{1,2}	L-50 ¹	L-85 ²	L-100 ¹
Viscosity, Kinematic, ASTM D445 at 38°C (100°F), cSt at 99°C (210°F), cSt	27-33 —	108-112 —	118-128 —	210-227 —
Flash point, °C (°F), min. Cleveland open cup, ASTM D92 Pensky-Martens closed cup, ASTM D83	138 (280) —	138 (280) —	149 (300) —	141 (285) —
Specific gravity, at 15.5°C (60°F) ASTM D1298	.830-.845	.845-.860	.845-.860	.850-.865
Color, APHA, max. Photometric, haze-free	70	70	70	70
Haze, Photometric, max.	15	15	15	15
Appearance (all grades) ¹ Blend ² Straight run	clear	clear	clear	clear

Non-specification Properties

Viscosity, Brookfield, ASTM D4402 at 38°C (100°F), cP at 99°C (210°F), cP	25 —	90 —	125 —	183 —
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Total sulfur, X-ray analysis, ppm	< 5	< 5	< 5	< 5
Evaporation loss, 10 hr at 99°C (210°F), wt %, ASTM D972	12	6	5	6

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 Title 21, CFR 177.1430 Isobutylene-butene copolymers used in food contact surfaces
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 Title 21, CFR 178.3910 Surface lubricants used in the manufacture of metallic articles used in food contact

Property values for the Amoco polybutenes listed below are subject to change without notice.

The non-specification data that follow are from an analysis of randomly selected samples of Amoco polybutene and are considered typical or average. They are not warranted by Amoco, however, and do not modify, amend, enlarge or create any specification or warranty.

Health and Safety Information

The product(s) described herein may require precautions in handling and use. Material Safety Data Sheets (MSDS) for Amoco products are available upon request from your Amoco sales representative or by writing the address shown on this brochure. Always consult the MSDS for products you consider using.

H-15 ¹	H-25 ¹	H-35 ¹	H-40 ¹	H-50 ¹	H-100 ¹	H-300 ¹	H-1500 ¹	H-1900 ¹
29 - 35	48 - 58	73 - 81	74 - 85	109 - 125	196 - 233	635 - 680	3,026 - 3,381	4,069 - 4,382
141 (285)	149 (300)	154 (310)	163 (325)	154 (310)	155 (311)	150 (320)	170 (338)	170 (338)
.890 - .871	.868 - .879	.871 - .887	.875 - .890	.876 - .893	.885 - .902	.893 - .910	.896 - .913	.900 - .917
70	70	70	70	70	50	50	50	50
15	15	15	15	15	12	12	12	12
clear	clear	clear	clear	clear	clear	clear	clear	clear
28	43	63	77	115	179	575	2,750	3,850
2,441 142	4,990 259	8,910 352	12,150 444	15,500 524	35,900 985	140,000 3,000	872,000 14,900	788,000 18,700
600	670	725	750	815	940	1330	2145	2270
75	85	90	92	98	115	165	250	270
-35 (-30)	-26 (-15)	-15 (+5)	-29 (-21)	-15 (+5)	-7 (+20)	+2 (+35)	+18 (+65)	+18 (+85)
7.20	7.29	7.32	7.34	7.34	7.41	7.48	7.53	7.55
1.4847	1.4849	1.4872	1.4920	1.4901	1.4941	1.4970	1.5022	1.5042
0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
4	5	3	0.9	1	0.6	0.4	0.2	0.1

MATERIAL SAFETY DATA SHEET



INDOPOL® H-300

MSDS No. 01851000 ANSI/ENGLISH

1.0 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: INDOPOL® H-300

MANUFACTURER/SUPPLIER:

Amoco Chemical Company
200 East Randolph Drive
Chicago, Illinois 60601 U.S.A.

EMERGENCY HEALTH INFORMATION:

1 (800) 447-8735

EMERGENCY SPILL INFORMATION:

1 (800) 424-9300 CHEMTREC (USA)

**OTHER PRODUCT SAFETY
INFORMATION:**

(312) 856-3907

2.0 COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS#	Range % by Wt.
Polybutene (Isobutylene/butene copolymer)	9003-29-6	100

(See Section 8.0, "Exposure Controls/Personal Protection", for exposure guidelines)

3.0 HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: This product has been evaluated and does not require any hazard warning on the label under OSHA criteria.

POTENTIAL HEALTH EFFECTS:

EYE CONTACT: Heated material can cause thermal burns.

SKIN CONTACT: Heated material can cause thermal burns.

INHALATION: No significant health hazards identified.

INGESTION: No significant health hazards identified.

HMIS CODE: (Health:0) (Flammability:1) (Reactivity:0)

4.0 FIRST AID MEASURES

EYE: Hot material: Flush eyes with plenty of water for at least 15 minutes. Seek medical assistance for mechanical removal of polybutene from the eye. The use of flush fluid, other than water, is not recommended.

Cold Material: Flush eyes with plenty of water.

SKIN: Hot material: Immediately flush in cool water for at least 15 minutes. Get immediate medical attention. Cold material: Clean exposed skin with waterless hand cleaner.

INHALATION: If adverse effects occur, remove to uncontaminated area. Get medical attention.

INGESTION: If a large amount is swallowed, get medical attention.

NOTE TO PHYSICIANS: Medical personnel may leave the polybutene in place to minimize physical damage to the skin. Medical personnel may cover the polybutene with a burn gel to prevent the adhesion of the dressing to the polybutene.

5.0 FIRE FIGHTING MEASURES

FLASHPOINT: 320°F(160°C) (Pensky-Martens closed cup) ASTM D93

UEL: Not determined.

LEL: Not determined.

AUTOIGNITION TEMPERATURE: Not determined.

FLAMMABILITY CLASSIFICATION: None

EXTINGUISHING MEDIA: Agents approved for Class B hazards (e.g., dry chemical, carbon dioxide, foam, steam) or water fog.

UNUSUAL FIRE AND EXPLOSION HAZARDS: None identified.

FIRE-FIGHTING EQUIPMENT: Firefighters should wear full bunker gear, including a positive pressure self-contained breathing apparatus.

PRECAUTIONS: Where the insulation of tankage and equipment is required, it is recommended that closed-cell foam insulation be used to minimize a potential autoignition hazard.

HAZARDOUS COMBUSTION PRODUCTS: Incomplete burning can produce carbon monoxide and/or carbon dioxide and other harmful products.

6.0 ACCIDENTAL RELEASE MEASURES

Remove mechanically or contain on an absorbent material such as dry sand or earth. Keep out of sewers

and waterways. Treat as an oil spill.

7.0 HANDLING AND STORAGE

HANDLING: Keep away from ignition sources (e.g., heat, sparks, or open flames).

STORAGE: Where the insulation of tankage and equipment is required, it is recommended that closed-cell foam insulation be used to minimize a potential autoignition hazard.

8.0 EXPOSURE CONTROLS / PERSONAL PROTECTION

EYE: Wear chemical goggles if material is handled hot. Cold material: None required; however, use of eye protection is good industrial practice.

SKIN: Wear heat-resistant protective gloves, clothing and face shield that are able to withstand the temperature of the molten product.

INHALATION: None required; however, use of adequate ventilation is good industrial practice.

ENGINEERING CONTROLS: Control airborne concentrations below the exposure guidelines.

EXPOSURE GUIDELINES:

Component	CAS#	Exposure Limits
Polybutene (isobutylene/butene copolymer)	9003-29-6	No exposure limit established

9.0 CHEMICAL AND PHYSICAL PROPERTIES

APPEARANCE AND ODOR: Liquid. Clear.

pH: Not determined.

VAPOR PRESSURE: Not determined.

VAPOR DENSITY: Not determined.

BOILING POINT: Not determined.

MELTING POINT: Not determined.

SOLUBILITY IN WATER: Negligible, below 0.1%.

SPECIFIC GRAVITY (WATER=1): 0.895

VISCOSITY: 635-690cSt at 210°F (99°C)

POUR POINT: 35°F (1.7°C)

10.0 STABILITY AND REACTIVITY

STABILITY: Stable.

CONDITIONS TO AVOID: None identified.

MATERIALS TO AVOID: None identified.

HAZARDOUS DECOMPOSITION: None identified. Incomplete burning can produce carbon monoxide and/or carbon dioxide and other harmful products.

HAZARDOUS POLYMERIZATION: Will not occur.

11.0 TOXICOLOGICAL INFORMATION

ACUTE TOXICITY DATA:

EYE IRRITATION: Testing not conducted. See Other Toxicity Data.

SKIN IRRITATION: Testing not conducted. See Other Toxicity Data.

DERMAL LD50: Testing not conducted. See Other Toxicity Data.

ORAL LD50: Testing not conducted. See Other Toxicity Data.

INHALATION LC50: Testing not conducted. See Other Toxicity Data.

OTHER TOXICITY DATA: A range of similar materials have been tested for eye and skin irritation. For eye irritation, none of these materials have produced scores exceeding 8.0 out of a possible total of 110 with complete disappearance of effects in 72 hours (rabbits). Consequently, this material may be a slight eye irritant. When applied to the skin of rabbits, similar materials scored 1.5 out of a possible total of 8.0, indicating that this product may be a slight skin irritant. Similar materials were practically non-toxic when tested in acute oral (rat LD50 > 34,600 mg/kg), dermal (rabbit LD50 > 10,250 mg/kg), and inhalation studies (rat LC50 > 850 mg/m³). In a two year rat and dog study and a three-generation reproduction study with rats, similar materials caused no adverse effects when fed at levels as high as 2% in the diet.

No component of this product at levels greater than 0.1% is identified as a carcinogen by ACGIH or the International Agency for Research on Cancer (IARC). No component of this product present at levels greater than 0.1% is identified as a carcinogen by the U.S. National Toxicology Program (NTP) or the U.S. Occupational Safety and Health Act (OSHA).

12.0 ECOLOGICAL INFORMATION

Ecotoxicity Test Data: Arnoco has not tested the ecotoxicity of this product. The following information was obtained from studies of similar polybutenes.

Polybutenes have very low solubility in water so aquatic studies refer to the amount of chemical added to the test system, not the amount dissolved in water. Most acute aquatic toxicity studies of these have used the water-accommodated fraction, obtained by mixing the test chemical in water for 20 to 24 hours,

then siphoning the water for use in the test.

Tests of polybutene found no toxicity to the rainbow trout (*Oncorhynchus mykiss*) or the fathead minnow (*Pimephales promelas*), two representative freshwater fish. The 96-hour LC50 for rainbow trout is at least 10,000 mg/L. The 96-hour LC50 for fathead minnows is greater than 1,000 mg/L, expressed as the nominal amount of test substance used to prepare the water-accommodated fraction.

Tests of the freshwater invertebrate *Daphnia magna* suggest that these chemicals are not toxic, although globules of undissolved test material may trap individuals. In a test of the water-accommodated fraction, the 48-hour EC50 exceeded 1,000 mg/L, the highest concentration tested. In a separate test of water-accommodated fraction of another similar chemical, the 48-hour EC50 exceeded 10,000 mg/L, the highest concentration tested.

Polybutenes are not expected to adversely affect microbial activity. Following a modified OECD Method 209, bacterial inhibition using activated sludge microbes was tested with several grades of Amoco polybutenes. The tests showed no bacterial inhibition at polybutene loadings of up to 25 mg/L, measured through oxygen consumption (respiration).

In separate tests, the biological oxygen demand (BOD) of microorganisms was measured. In these tests, there was no evidence of bacterial toxicity, even at loadings of polybutenes of about 200,000 mg/L. In addition, an epoxidized polybutene was found to be non-mutagenic and non-toxic to the microorganism used in the Ames mutagenicity assay, *Salmonella typhimurium*.

Biodegradation Potential: In the BOD tests described above, only very slight biodegradation was measured. The oxygen demand is used in this test to measure how much polybutene is degraded by microorganisms. For all grades of polybutene, BOD was small and it decreased with increasing polybutene chain length. The reduced capacity of the microorganisms to decompose higher molecular weight polybutenes is probably due to the increased size of the polybutene molecules. Polybutenes are not expected to be readily biodegradable, although tests have not been conducted using current OECD or US EPA test methods.

Bioconcentration Potential: Testing not conducted. See Other Ecological Information.

Other Ecological Information: Polybutenes are not expected to be bioconcentrated or bioaccumulated by organisms because they are poorly soluble in water and many organic solvents, and because their molecular size minimizes bioavailability. The weight of evidence from toxicity tests, comparisons with structurally similar chemicals, and professional judgement indicates that polybutenes are non-hazardous in the environment.

Using the calculation method presented in the German Water Classification procedure, Amoco has assigned a WGK classification of zero to polybutenes. This classification indicates that polybutenes are not water endangering.

13.0 DISPOSAL INFORMATION

Disposal must be in accordance with applicable federal, state, or local regulations. Determine waste classification at time of disposal. Conditions of use may render the spent product a hazardous waste. Enclosed-controlled incineration is recommended unless directed otherwise by applicable ordinances.

Since the emptied containers retain product residue, follow product insert warnings even after container is emptied.

14.0 TRANSPORTATION INFORMATION

U.S. DEPT OF TRANSPORTATION

Shipping Name Elevated Temperature Liquid, N.O.S.
Hazard Class 9
Identification Number UN3257
Packing Group III

INTERNATIONAL INFORMATION:

Sea (IMO/IMDG)

Shipping Name Elevated Temperature Liquid, N.O.S.
Class 9
Packing Group III
UN Number UN3257

Air (ICAO/IATA)

Shipping Name Not regulated for non-bulk shipments only, Bulk shipment prohibited.

European Road/Rail (ADR/RID)

Shipping Name Not Regulated.

Canadian Transportation of Dangerous Goods

Shipping Name Elevated Temperature Liquid, N.O.S.
Hazard Class 9
UN Number UN3257
Packing Group III

15.0 REGULATORY INFORMATION

CERCLA SECTIONS 102/103 HAZARDOUS SUBSTANCES (40 CFR Part 302.4): This product is not reportable under 40 CFR Part 302.4.

SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR Part 355): This product is not regulated under Section 302 of SARA and 40 CFR Part 355.

SARA TITLE III SECTIONS 311/312 HAZARDOUS CATEGORIZATION (40 CFR Part 370): This product is not regulated under SARA Title III Section 311/312.

SARA TITLE III SECTION 313 (40 CFR Part 372): This product is not regulated under Section 313 of SARA and 40 CFR Part 372.

U.S. INVENTORY (TSCA): Listed on inventory.

OSHA HAZARD COMMUNICATION STANDARD: Not hazardous per 29 CFR 1910.1200(d).

WHMIS Controlled Product Classification: Not a Controlled Product under Canada's Workplace Hazardous Material Information System.

EC INVENTORY (EINECS/ELINCS): In compliance.

JAPAN INVENTORY (MITI): Listed on inventory.

AUSTRALIA INVENTORY (AICS): Listed on inventory.

KOREA INVENTORY (ECL): Listed on inventory.

CANADA INVENTORY (DSL): All of the components of this product are listed on the DSL.

PHILIPPINE INVENTORY (PICCS): Not determined.

FOOD CONTACT STATUS

FDA:

This product is approved for use by the FDA under the following sections of 21 CFR:

Part 175.105 as a component of adhesives in food packaging when used in accordance with the specifications of this subpart.

Part 175.300 as a component of resinous and polymeric coatings for food contact surfaces when used in accordance with the specifications of this subpart.

Part 176.170 as a component of paper and paperboard in contact with aqueous and fatty foods when used in accordance with the specifications of this subpart.

Part 176.180 as a component of paper and paperboard in contact with dry food when used in accordance with the specifications of this subpart.

Part 177.1430 as a component of articles intended for use in contact with food when used in accordance with the specifications of this subpart.

Part 178.3570 as a lubricant for use on machinery with incidental food contact when used in accordance with the specifications of this subpart.

Part 178.3910 as a surface lubricant used in the manufacture of metallic articles that contact food, subject to the provisions of this subpart.

Part 177.2800 as a component of textiles and textile fibers used in the manufacture of articles subject to the provisions of this subpart.

Part 177.1520 as a plasticizer in polyethylene used in the manufacture of articles subject to the provisions of this subpart.

Part 177.1640 as a plasticizer in polystyrene used in the manufacture of articles subject to the provisions of this subpart.

Part 178.3740 as a plasticizer in polymeric substances used in the manufacture of articles or components of articles intended for use with food when used in accordance with the specifications listed in this subpart.

Part 175.125 as a component of pressure-sensitive adhesives used as the food contact surface of labels and/or tapes applied to food in accordance with the prescribed conditions of this subpart.

Part 176.210 as a component of defoaming agents used in the manufacture of paper and paperboard intended for use with food in accordance with the prescribed conditions of this subpart.

Part 177.2260(d)(2) as a component of resin-bonded filters used in producing, manufacturing, processing, and preparing food subject to the provisions of this subpart.

16.0 OTHER INFORMATION

Various grades of Amoco Polybutene meet FDA and USDA regulations. Information concerning compliance with a specific FDA regulation or USDA approval can be obtained upon request.

To remove polybutene from clothing, use a solvent (i.e. mineral spirits).

When polybutene is shipped at temperatures $<12^{\circ}\text{F}$ (100°C), the appropriate transportation information is as follows:

U.S. DEPT. OF TRANSPORTATION INDOPOL® H-300

Shipping Name: Not Regulated.

INTERNATIONAL INFORMATION INDOPOL® H-300

Sea (IMO/IMDG)

Shipping Name: Not Regulated.

Air (ICAO/IATA)

Shipping Name: Not regulated for non-bulk shipments only, bulk shipment prohibited.

European Road/Rail (ADR/RID)

Shipping Name: Not Regulated.

Canadian Transportation of Dangerous Goods

Shipping Name: Not Regulated.

Prepared by:

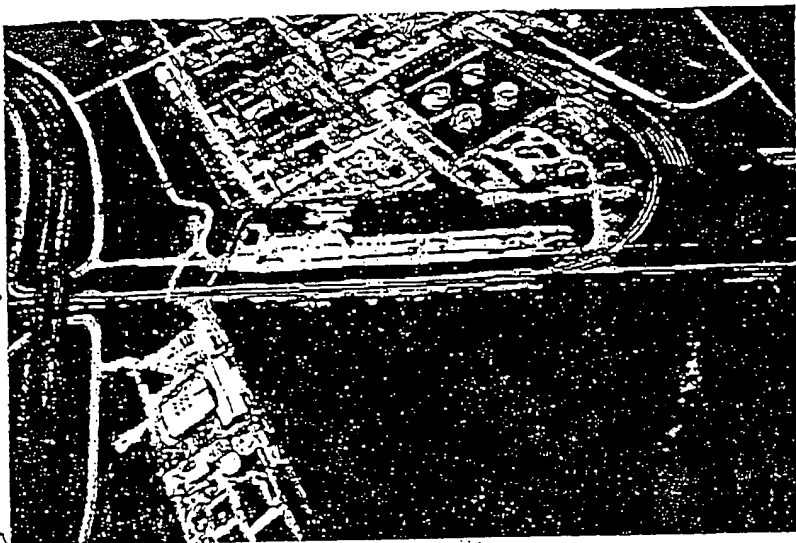
Environment, Health and Safety Department

Issued: February 27, 1997

Supersedes: September 25, 1996

This Material Safety Data Sheet conforms to the requirements of ANSI Z400.1.

This material safety data sheet and the information it contains is offered to you in good faith as accurate. We have reviewed any information contained in this data sheet which we received from sources outside our company. We believe that information to be correct but cannot guarantee its accuracy or completeness. Health and safety precautions in this data sheet may not be adequate for all individuals and/or situations. It is the user's obligation to evaluate and use this product safely and to comply with all applicable laws and regulations. No statement made in this data sheet shall be construed as a permission or recommendation for the use of any product in a manner that might infringe existing patents. No warranty is made, either express or implied.



Chevron's Shawinigan Black manufacturing facility is part of the Cedar Bayou Petrochemical Complex located in Baytown, Texas, near Houston.

TABLE 2. CHEVRON SHAWINIGAN BLACK
TYPICAL PRODUCT SPECIFICATIONS

Grade	Bulk Density (pound/cubic foot)	Absorption Stiffness (milliliters/5 grams)
AB 50P	4.95-5.25	40.0 min.
Code 55	5.25-5.75	39.0 min.
AB 50%	5.9 - 6.4	37.5 min.
AB 70%	7.5 - 8.5	29.0 min.
AB 100%	12.5-14.5	19.0 min.

TABLE 3. CHEVRON SHAWINIGAN BLACK
TYPICAL PHYSICAL AND CHEMICAL PROPERTIES

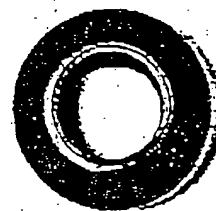
All Grades

True Density - Approximate	1.95 g/cc
Mean Particle Diameter	40 nm
Iodine Adsorption (ASTM D1510)	90 g/kg
Moisture Content (ASTM D1509)	<0.20%
Ash Content (ASTM D1506)	<0.05%
Sieve Residue - 325 mesh (ASTM D1514)	<0.02%
pH (ASTM D1512)	6.5-7.5
DBP Absorption - AB 100% only (ASTM D2414)	180-210 ml/100g

() Denotes Test Method Used



Shawinigan Black's molecular structure provides high absorptivity, a property valued by the dry-cell battery industry.



Because of its superior thermal conductivity abilities, Shawinigan Black can significantly improve tire production when used in passenger-tire casing bladders.



Shawinigan Black is used in high-temperature greases, specialty lubricants, and several construction sealants and caulks.

Material Safety Data Sheet



ACETYLENE BLACK

MSDS: SC0019 Revision #:14 Revision Date:06/18/97

Print MSDS

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

ACETYLENE BLACK

SYNONYM: CARBON BLACK
SHAWINIGAN BLACK

COMPANY IDENTIFICATION

Chevron Chemical Company
U. S. Chemicals Division
P.O. Box 3766
Houston, TX 77253-3766

EMERGENCY TELEPHONE NUMBERS

HEALTH (24 hr): (800)231-0623 or
(510)231-0623 (International)
TRANSPORTATION (24 hr): CHEMTREC
(800)424-9300 or (703)527-3867
Int'l collect calls acceptedPRODUCT INFORMATION: MSDS Requests: (713) 754-4432
Technical Information: (713) 754-4432
(Above numbers available 7:30 a.m. - 4:30 p.m. CST)SPECIAL NOTES: CUSTOMER SERVICE: (800) 231-3260
PRODUCT CODES/NAMES: ABS0% ABS0P ABS0X ABC55 AB70% AB100% ABDEAD.
PACKAGING CODES: 48PT 54PT BG PBAG SS.

2. COMPOSITION/INFORMATION ON INGREDIENTS

100.0 % ACETYLENE BLACK

CONTAINING

COMPONENTS	AMOUNT	LIMIT/QTY	AGENCY/TYPE
CARBON-BLACK			
Chemical Name: CARBON-BLACK			
CAS1333864	100.00%	3.5 mg/m3 3.5 mg/m3	ACGIH TWA OSHA PEL

COMPOSITION COMMENT:
All the components of this material are on the Toxic Substances Control
Act Chemical Substances Inventory.

3. HAZARDS IDENTIFICATION

***** EMERGENCY OVERVIEW *****

Odorless black powder

- MAY CAUSE RESPIRATORY TRACT IRRITATION IF INHALED

POTENTIAL HEALTH EFFECTS

EYE:

Not expected to cause prolonged or significant eye irritation.

SKIN:

Contact with the skin is not expected to cause prolonged or significant irritation. Not expected to be harmful to internal organs if absorbed through the skin.

INGESTION:

Not expected to be harmful if swallowed.

INHALATION:

The dust from this material may cause respiratory irritation. See Section 11 for additional information.

SIGNS AND SYMPTOMS OF EXPOSURE:

Respiratory irritation: may include coughing and difficulty breathing.

CARCINOGENICITY:

may cause cancer in laboratory animals, but is not considered to be a human carcinogen. IARC Group 2B. See Section 11 for additional information.

TARGET ORGANS:

Repeated inhalation of this material at concentrations above the recommended exposure limit may cause damage to the following organ(s):

>Lung< Risk depends on duration and level of exposure. See Section 11 for additional information.

4. FIRST AID MEASURES

EYE:

No specific first aid measures are required because this material is not expected to cause eye irritation. As a precaution remove contact lenses, if worn, and flush eyes with water.

SKIN:

No specific first aid measures are required because this material is not expected to be harmful if it contacts the skin. As a precaution, remove clothing and shoes if contaminated. Wash skin with soap and water. Wash or clean contaminated clothing and shoes before reuse.

INGESTION:

No specific first aid measures are required because this material is not expected to be harmful if swallowed. Do not induce vomiting. As a precaution, give the person a glass of water or milk to drink and get medical advice. Never give anything by mouth to an unconscious person.

INHALATION:

Move the exposed person to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if breathing difficulties continue.

5. FIRE FIGHTING MEASURES

FIRE CLASSIFICATION:

Classification (29 CFR 1910.1200): Not flammable or combustible.

FLAMMABLE PROPERTIES:

FLASH POINT: NA

AUTOIGNITION: 900C

FLAMMABILITY LIMITS (% by volume in air): Lower: NA Upper: NA

EXTINGUISHING MEDIA:

CO2, dry chemical, foam and water fog.

NEPA RATINGS: Health 1; Flammability 1; Reactivity 0.

FIRE FIGHTING INSTRUCTIONS:

This material will burn although it is not easily ignited. For fires involving this material, do not enter any enclosed or confined fire space

without proper protective equipment, including self-contained breathing apparatus.

The ignition temperature of this material in air is approximately 900C. If ignited, flames may not be visible in the burning powder. Some heat and smoke may be noticeable. Soaking with water may spread the fire due to the burning powder floating on the water. High pressure fire extinguishing equipment may blow the burning powder into other areas resulting in more fires.

RECOMMENDED ACTION: If possible, isolate the burning powder into an open area (preferably outside), monitor, and allow the fire to burn itself out. Gently applying a fine soapy water mist to the area of the fire may be helpful. Stop spraying if water starts to puddle. Eliminating the source of oxygen may also be helpful. DO NOT spray with high pressure fire extinguishers.

COMBUSTION PRODUCTS:

Normal combustion forms carbon dioxide and water vapor; incomplete combustion can produce carbon monoxide.

6. ACCIDENTAL RELEASE MEASURES

CHEMTREC EMERGENCY NUMBER (24 hr): (800)424-9300 or (703)527-3887

International Collect Calls Accepted

ACCIDENTAL RELEASE MEASURES:

Sweep up material and place in a disposable container.

Based on information available to Chevron Chemical Company, this product is neither listed as a hazardous waste nor does it exhibit any of the characteristics that would cause it to be classified or disposed of as a RCRA hazardous waste.

7. HANDLING AND STORAGE

Do not breathe dust at levels above the recommended exposure limits.

Acetylene Black is a fine, lightweight material that tends to become airborne when spilled to the atmosphere. Care should be taken during handling to prevent damage to packaging. Spilled material should be cleaned up carefully using a broom or brush to minimize airborne dust. Do not use a vacuum cleaner unless it is designed to contain very fine particles.

This product is a good conductor of electricity and may generate electrical hazards and equipment failure by bridging electrical insulation if proper precautions are not taken. Remove, seal, or cover nearby electrical equipment. Maintain a constant airflow through areas exposed to acetylene black and periodically clean electrical equipment.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS

Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below the recommended exposure limits.

PERSONAL PROTECTIVE EQUIPMENT

EYE/FACE PROTECTION:

Wear safety glasses with side shields when working with this material as a good safety practice.

SKIN PROTECTION:

Wear protective clothing to minimize skin contact as a good industrial hygiene practice. Selection of protective clothing will depend on

operations conducted. Consider physical requirements and other substances when selecting protective clothing.

RESPIRATORY PROTECTION:

Determine if airborne concentrations are below the recommended exposure limits. If not, select a NIOSH/MSHA approved respirator that provides adequate protection from measured concentrations of this material. Use the following element(s) for air-purifying respirators: Dust and Mist.

Use a positive pressure, air-supplying respirator if there is potential for uncontrolled release, exposure levels are not known, or other circumstances where air-purifying respirators may not provide adequate protection.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL DESCRIPTION:

Odorless black powder

pH:	NA
VAPOR PRESSURE:	NA
VAPOR DENSITY	
(AIR=1):	NA
BOILING POINT:	3500C (6332F)
FREEZING POINT:	NA
MELTING POINT:	NA
SOLUBILITY:	NA
DENSITY:	1.95 g/cm3 (He displacement)
EVAPORATION RATE:	NA
VISCOSITY:	NA
PERCENT VOLATILE	
(VOL):	NA

10. STABILITY AND REACTIVITY

HAZARDOUS DECOMPOSITION PRODUCTS:

NA.

CHEMICAL STABILITY:

Stable.

CONDITIONS TO AVOID:

None.

INCOMPATIBILITY WITH OTHER MATERIALS:

May react with strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.

HAZARDOUS POLYMERIZATION:

Polymerization will not occur.

11. TOXICOLOGICAL INFORMATION

EYE EFFECTS:

The eye irritation hazard is based on data for a similar material.

SKIN EFFECTS:

The acute dermal toxicity is based on data for a similar material. The skin irritation hazard is based on data for a similar material.

ACUTE ORAL EFFECTS:

The acute oral toxicity is based on data for a similar material.

ACUTE INHALATION EFFECTS:

The acute respiratory toxicity is based on data for a similar material.

CHRONIC EFFECTS/CARCINOGENICITY:

The International Agency for Research on Cancer (IARC) has classified carbon black as a Group 2B carcinogen (possibly carcinogenic to humans) based on "sufficient evidence" in animals and "inadequate evidence" in humans. Carbon black has not been listed as a carcinogen by the National Toxicology Program or the Occupational Safety and Health Administration.

Acetylene black, a high purity carbon black, is made from the thermal decomposition of acetylene gas. It is a pure form of carbon containing less than 0.2 ppm polycyclic aromatic hydrocarbons (PAHs). Therefore, acetylene black is not expected to directly interact with DNA to present a cancer risk by skin exposure or by inhalation. However, chronic inflammation, lung fibrosis, and lung tumors have been observed in rats in studies in which rats inhaled carbon black for a lifetime at concentrations that overwhelmed the lung particle clearance mechanisms and caused the carbon black to accumulate in the lung. Results of these studies indicate that tumors were caused by the physical effect of overloading the lungs with particles and suggest that exposures below the exposure limit would not cause adverse health effects.

Studies of workers in the carbon black industry indicate that elevated rates of lung cancer have not been associated with occupational exposures to carbon black. Studies in Eastern Europe of workers heavily exposed to carbon black reported respiratory diseases including bronchitis, fibrosis, pneumoconiosis, emphysema, and rhinitis, but not cancer; however, these studies are of questionable validity, due to inadequate study design and methodology, lack of appropriate controls for cigarette smoking, and confounding with concurrent exposures to other substances. Studies of workers in the carbon black production industries of North America and Western Europe show that pulmonary effects of exposure to carbon black are limited to slight radiological changes in the lung, chronic bronchitis, and slight reduction in lung function.

Tumors induced in rat lungs by carbon black, as well as other biologically inert particles, under conditions of overload may be rat-specific effects as they are not seen in mice or hamsters tested under similar conditions or in studies of carbon black workers. We believe that the data presently available for carbon black do not support a significantly increased risk of cancer or other adverse health effects for workers when precautions outlined in this document are followed.

12. ECOLOGICAL INFORMATION

ECOTOXICITY:

This material is not expected to be harmful to aquatic organisms.

ENVIRONMENTAL FATE:

This material is not expected to be readily biodegradable.

13. DISPOSAL CONSIDERATIONS

Based on information available to Chevron Chemical Company, this product is neither listed as a hazardous waste nor does it exhibit any of the characteristics that would cause it to be classified or disposed of as a RCRA hazardous waste.

14. TRANSPORT INFORMATION

The description shown may not apply to all shipping situations. Consult 49CFR, or appropriate Dangerous Goods Regulations, for additional description requirements (e.g., technical name) and mode-specific or quantity-specific shipping requirements.

DOT SHIPPING NAME: NOT DESIGNATED AS A HAZARDOUS MATERIAL BY THE
FEDERAL DOT

DOT HAZARD CLASS: NOT APPLICABLE

DOT IDENTIFICATION NUMBER: NOT APPLICABLE

DOT PACKING GROUP: NOT APPLICABLE

15. REGULATORY INFORMATION

SARA 311 CATEGORIES:

1. Immediate (Acute) Health Effects:	YES
2. Delayed (Chronic) Health Effects:	YES
3. Fire Hazard:	NO
4. Sudden Release of Pressure Hazard:	NO
5. Reactivity Hazard:	NO

REGULATORY LISTS SEARCHED:

01=SARA 313	11=NJ RTK	22=TSCA Sect 5(a)(2)
02=MASS RTK	12=CERCLA 302.4	23=TSCA Sect 6
03=NTP Carcinogen	13=MN RTK	24=TSCA Sect 12(b)
04=CA Prop 65-Carcin	14=ACGIH TWA	25=TSCA Sect 8(a)
05=CA Prop 65-Repro Tox	15=ACGIH STEL	26=TSCA Sect 8(d)
06=IARC Group 1	16=ACGIH Calc TLV	27=TSCA Sect 4(a)
07=IARC Group 2A	17=OSHA PEL	28=Canadian WHMIS
08=IARC Group 2B	18=DOT Marine Pollutant	29=OSHA CEILING
09=SARA 302/304	19=Chevron TWA	30=Chevron STEL
10=PA RTK	20=EPA Carcinogen	

The following components of this material are found on the regulatory lists indicated.

CARBON-BLACK

is found on lists: 02,06,10,11,13,14,17,28.

HMIS CLASSIFICATION:

Class D, Division 2, Subdivision A: Very Toxic Material
-Carcinogenicity

16. OTHER INFORMATION

NFPA RATINGS: Health 1; Flammability 1; Reactivity 0;
EMIS RATINGS: Health 1*; Flammability 1; Reactivity 0;
(0-Least, 1-Slight, 2-Moderate, 3-High, 4-Extreme, PPE:- Personal Protection Equipment Index recommendation, *- Chronic Effect Indicator). These values are obtained using the guidelines or published evaluations prepared by the National Fire Protection Association (NFPA) or the National Paint and Coating Association (for HMIS ratings).

REVISION STATEMENT:

Changes have been made throughout this Material Safety Data Sheet. Please read the entire document.

ABBREVIATIONS THAT MAY HAVE BEEN USED IN THIS DOCUMENT:

TLV - Threshold Limit Value	TWA - Time Weighted Average
STEL - Short-term Exposure Limit	TPQ - Threshold Planning Quantity
RQ - Reportable Quantity	PEL - Permissible Exposure Limit
C - Ceiling Limit	CAS - Chemical Abstract Service Number
A1-5 - Appendix A Categories	() - Change Has Been Proposed
NDA - No Data Available	NA - Not Applicable

Prepared according to the OSHA Hazard Communication Standard (29 CFR 1910.1200) and the ANSI MSDS Standard (Z400.1) by the Toxicology and Health Risk Assessment Unit, CRTC, P.O. Box 4054, Richmond, CA 94804

The above information is based on the data of which we are aware and is believed to be correct as of the date hereof. Since this information may be applied under conditions beyond our control and with which we may be

unfamiliar and since data made available subsequent to the date hereof may suggest modification of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.

THIS IS THE LAST PAGE OF THIS MSDS



Chevron

Chevron Chemical Company
U.S. Chemicals Division
1301 McKinney Street
Houston, TX 77010-3030
P.O. Box 3765
Houston, TX 77253-3765
Phone 713 754 2000

customer service

SHAWINIGAN ACETYLENE BLACK
AB 50% AB C55 AB 100%
PRICE SCHEDULE
LTL QUANTITIES

<u>QUANTITY</u>			<u>PRICE PER POUND</u>
1	-	150 Lbs	\$1.87
151	-	900 Lbs	\$1.77
901	-	3,000 Lbs	\$1.68
3,001	-	5,000 Lbs	\$1.61
5,001	-	8,000 Lbs	\$1.54
8,001	-	and over	\$1.47

what will what

FOB Baytown, Texas. Freight Collect. Terms: Net 30 Days.

GRADES AND PACKING

Single bag-net weight
Carton (6 bags)
Carton (12 bags)

50% COMPRESSION
GRADES AB 50 & AB C55

12.5 Lbs
75 Lbs - 1 carton
150 Lbs - 1 carton

100% COMPRESSION
GRADE AB 100

25 Lbs
150 Lbs
300 Lbs

225 lbs need 220 lbs

- Minimum order quantity is one bag.
- Packaged in Three-ply Kraft paper bags.
- LTL orders greater than twenty cartons (6,000 lbs - 100% compressed or 3,000 lbs - 50% compressed) will be shipped on pallets.

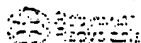
order 1 X 75 cartons (6 bags)

order 1 X 150 cartons (12 bags)

order 225 lbs

need 220 lbs

Effective: April 1, 1996
Replaces: January 1, 1992





Chevron

**SHAWINIGAN ACETYLENE BLACK
AB 50P PRICE SCHEDULE**

Chevron Chemical Company
U.S. Chemicals Division
1301 McKinney Street
Houston, TX 77010-3030
P.O. Box 3766
Houston, TX 77253-3766
Phone 713 754 2000

**PRICE PER
POUND**

- (1) Truckload: (14,400 Lbs minimum)
PALLET SHIPMENTS ONLY

\$1.30

- Standard pallet sizes are 48 or 54 bags per pallet.
- Packaged in Three-ply Kraft paper bag.
- Maximum truck load - 24, 26, or 28 pallets per truck - depending upon trailer length.

- (2) Cases and Cartons:

**PRICE PER
POUND**

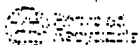
1 - 150 Lbs
151 - 900 Lbs
901 - 3,000 Lbs
3,001 - 5,000 Lbs
5,001 - 8,000 Lbs
8,001 Lbs and over

**\$1.92
\$1.82
\$1.73
\$1.66
\$1.59
\$1.52**

FOB Baytown, Texas, Freight Collect. Terms: Net 30 Days.

- Cartons are available in either six bag cartons or twelve bag cartons.
- Packaged in Three-ply Kraft paper bag.
- Orders greater than twenty cartons (3,000 lbs) will be shipped on pallets.

Effective: April 1, 1996
Replaces: January 1, 1992





Chevron

Chevron Chemical Company
U.S. Chemicals Division
1301 McKinney Street
Houston, TX 77010-3033
P.O. Box 3766
Houston, TX 77253-3766
Phone 713 754 2000

SHAWINIGAN ACETYLENE BLACK
AB 50% AB C55 AB 100%
PRICE SCHEDULE
TRUCKLOAD ONLY

SHIPPED ON PALLETS

PRICE PER
POUND

Minimum Truckload Quantities:

AB 50% Compressed - 14,400 Pounds
AB 100% Compressed - 28,800 Pounds

\$1.25
\$1.25

FOB Baytown, Texas. Freight Collect. Terms: Net 30 Days

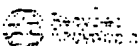
Pallet Sizes/Packaging

- Standard Pallet sizes are 48 or 54 bags/pallet
- 50% Compressed - Grades AB 50 and AB C55 - 12.5 lbs/bag
- 100% Compressed - Grades AB 100 - 25 lbs/bag
- Packaged in Three-ply Kraft paper bag

Typical Truck Load Quantities

- Truck load quantities may vary slightly due to trailer lengths. The following are typical:
45' trailer - 24 pallets
48' trailer - 26 pallets
53' trailer - 28 pallets

Effective: April 1, 1996
Replaces: January 1, 1992



EXXON CHEMICAL COMPANY



Polyolefins Americas
Adhesion Industries Business Unit - Americas

January 20, 1998



Mel Auerbach
M & K Co.
10242 Dayflower Drive
Twinsburg, OH 44087

Dear Mel:

Enclosed are data sheets on several of the Escorez resins we discussed the other day.

MSDS are coming separately.

Please call if you have questions or need samples.

Sincerely,

A handwritten signature in cursive script, appearing to read "Tom", written over a horizontal line.
Tom Nitkowski



Secrecy Agreement

M+K Associates

Product who patent has run out
Butyl 605 - Carbon Black

Swiggle -

Oil
Tackifiers
Desiccant

~~Ref~~ Mel let go by Tremco

Swiggle has skin - convoluted aluminum skin
metal creates problems

Problems - 1. Take a set - Glass unit
becomes loss
(Exxon ^{Expro} Butyl Rubber 5% of brominated
styrene)

Take 6x less of set?
adhesion similar?
too thick on extrusion?

FAX 330-963-0917
phone 330-963-5467
7/10/98

Mel Rarrbach

10242 Dayflower Dr.
Twinsburg, OH 44087

Initial goal - inexpensively 60 or 70/60
target chip

Begin gathering raw material

Butyl Ex-Pro 95% Butyl
5% paramethyl styrene

1% mold functionality

No unsaturation only through
paramethyl styrene
curable through amines - amino silane
alkylation with ZnO

also to promote
adhesion to
glass

Raw materials have to be
the same

Adhesion to glass -

Tensile

15 psi - 30-40 psi

Compression + Rebound -

Flow -

edge pressure 10 pli

$\frac{1}{4}$ x $\frac{1}{2}$ die

make simple test first

✓ Butyl 065
✓ Carbon Black N330 Cabot/Columbia

Acetylene Black ^{N351} ALAB Chevron
50% compressed

✓ Polybutene A300 Amoco
✓ SurPar 2280 - Sun Oil
Pentalyn 6xH - Hercules

Exxon ESCOREZ 1315 or alternative 1520?
Molecular Sieve 3A UOP } we can get it
BX UOP } we can't

✓ Zinc Oxide
Silane A1120 - amino - Union Carbide

Make copies of literature + send back

Quate - Monday afternoon
Will send RD.#



4 batches initially

Swiggle
EXPO

When we are
able

ZnO
amino-silane
ZnO + amino-silane

Kerr
McElrath
7/14/48

5-1.0 ^{phr} _{resins}
P/R catalytic
281-834-507
-5840

ZnO + Amino Silane last adhe

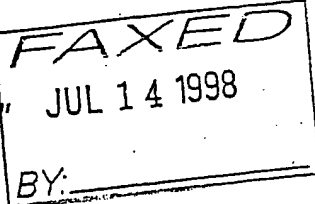
ZnO - add $< 110^{\circ}\text{C}$ MB & drop down
@ 3 mins + dump

Amino Silane - react @ ambient temp - will gel & create a problem; will not be able to extrude afterwards

- * this happens with di or tri amine cys
 - * w/ Amino Silane; get a 2^o amino silane
- 20% Polymer

Carotene Package??

"More Than Testing, We Care"



AKRON RUBBER DEVELOPMENT LABORATORY, INC.

2887 Gilchrist Road • Akron, Ohio 44305

1-800-830-ARDL • (330) 794-6600 • FAX (330) 794-6610

FAX TRANSMISSION

Date: 7/14/98

To: Mel Auerbach

Company: MxH Associates

U.S. Fax No.: (330) 963-0474

From: Barbara Udean

No. of Pages (including this page): 3

Overseas Fax No.: 9-011-_____

COMMENTS: _____

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2887 Gilchrist Road • Akron, Ohio 44305
Phone (330) 794-6600 • Fax (330) 794-6610
Toll Free (800) 830-ARDL

Page 1 of 2

July 14, 1998

Mel Auerbach
M & K Associates
10242 Dayflower Drive
Twinsburg, OH 44087

330-963-5467
330-963-0479 (fax)

Dear Mel,

It was a pleasure meeting with you last Friday to discuss your project. Having worked with several glazing seal manufacturers, I was extremely interested in your project. Tremco has done a very good job exploiting their patented technology for this industry. I think that you and your client have the correct idea to tackle them.

In this vein, I propose the following pricing and testing program.

Mixing and Extrusion

Mixing of Compounds using Banbury (4 mixes, so that we have enough to extrude)	\$440.00/compound
Curing (Sheet for Physical Properties)	\$48.00/compound
Extrusion (Using Haake with 1/4" x 1/2" die)	\$100.00/compound
Extrusion Die	\$450.00

Testing of Compound

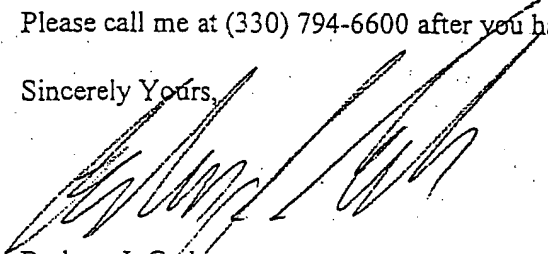
-Tensile Strength, Elongation, 100% Modulus (ASTM D412)	\$75.00/compound
Tensile Strength (After Aging, suggest 168 hours @ 80 C, ASTM D573)	\$150.00/compound
-Adhesion to Glass (Sample Preparation and Peel Strength)	\$125.00/compound
Adhesion to Glass (After Aging, suggest 168 hours @ 80° C)	\$170.00/compound
Tensile Compression (ASTM D695)	
Compress the sample at 0.050"/min and obtain S/S Curve	\$75.00/compound
- Compression Set (ASTM D395, suggest 72 hours @ 40° C)	\$75.00/compound
- Flow (modified Compression Set Test, using Glass, 3 temperatures)	\$150.00/compound
Rubber Properties in Forced Vibrations, Dynamic Mechanical Analysis, ASTM D2231 (change in compression force required over temperature range)	\$220.00/compound
Witness Surcharge	5% per test observation

I have based the above pricing on the initial first two compounds. If the project progresses to a research project, then we will provide an automatic 5% discount. In addition, the mixing, curing, and extrusion work have automatic quantity price breaks. I have included all of the tests that we talked about and some others that I think might provide you with important information. You can pick and choose which tests you want to move forward with. I do not recommend that you put the money into a die for the first set of compounding. We can run one of our strip dies, which will provide more than enough samples and information for the evaluation.

I am reviewing the materials and will send you a listing of what we have and what will need to be ordered later today. If we need to purchase any materials for the program, then these charges will be included in your invoice.

Please call me at (330) 794-6600 after you have had a chance to review this quote.

Sincerely Yours,



Barbara J. Gedeon
Manager, Plastics Testing Division

cc: Jerry Leyden
Scott Yates

EXXON CHEMICAL COMPANY

Baytown Polymers Center

FACSIMILE COVER SHEET



URGENT



NORMAL

To: MEL AUERBACH
 Company: CONSULTANT TO AMCAR
 Phone: _____
 Fax: 330-963-0479

From: KEN MSELRAHA
 Company: Exxon Chemical Company
TIBU Technology
 Phone: (281) 834-
 Fax: (281) 834-2678

Date: 7/16/98
 Pages including
 this cover page: 6

Comments: ^{PAGE} MEL, FOLLOWING IS SOME CURE RATE DATA
 FOR AN EXPRO™ ELASTOMER RUBBER
 COMPOUND USING A "COMPLY" CURE PACKAGE.
 THE FOLLOWING PAGES ARE RHEOMETER CURE
 CHARTS FOR A "SIMPLE" CURE PACKAGE.

THIS CARBON HAS
 0.85 MPa

→ EXPRO 96-4 100
 CARBON BLACK 45
 ZINC STEARATE 4

Ken M Selraha

Important Notice for Receiving Facsimile Operator

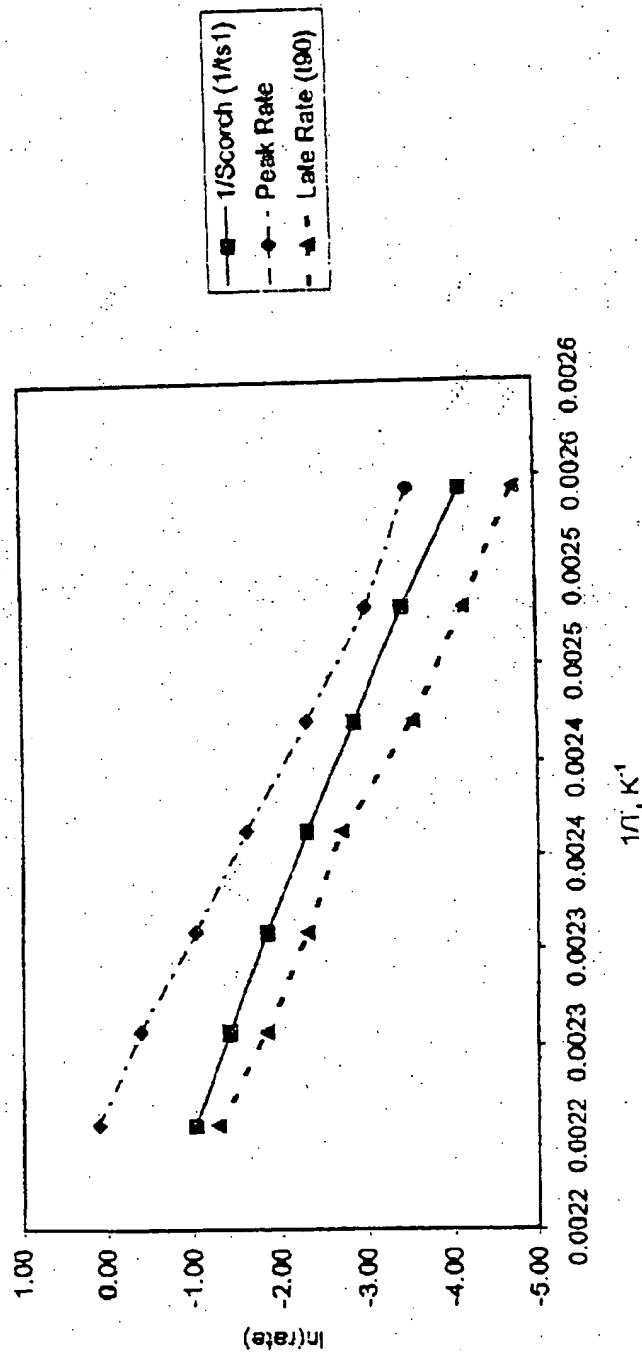
This facsimile may contain information intended for receipt and use solely by the addressee(s) named above. If you are not an intended recipient, any disclosure, copying or use of this information is prohibited. If you have received this facsimile in error, please notify us by telephone at (281) 834-2832 (at our expense) immediately. Thank you.

Exxpro Elastomer Cure Parameter

Exxpro MDX 96-4A	100.00	phr
Carbon Black N330	40.00	
Stearic Acid	0.50	
Sulfur	0.40	
Zinc Oxide	0.75	
Rylex 3011	0.60	
MBTS	0.80	

T (C)	ts1 (min)	ts0 (min)	T (K)	1/T	ln(1/s1)	peak	ln(rate)	late (ts0)	ln(rate)
180	2.76	9.6	453.15	0.0022	-1.02	1.11	0.10	0.28	-1.27
170	4.09	14.84	443.15	0.0023	-1.41	0.67	-0.40	0.16	-1.83
160	6.27	25.4	433.15	0.0023	-1.84	0.36	-1.02	0.10	-2.30
150	9.97	44.48	423.15	0.0024	-2.30	0.20	-1.81	0.07	-2.70
140	17.31	80.89	413.15	0.0024	-2.85	0.10	-2.30	0.03	-3.55
130	30.79	150.78	403.15	0.0025	-3.43	0.05	-3.00	0.02	-4.14
120	61.10	292.15	393.15	0.0025	-4.11	0.03	-3.51	0.01	-4.74

Arrhenius Plot for Exxpro Elastomer Cure Rates



9802036-1 180° @ 140°C

=====End-test trig=====

TEST DESCRIPTION: MDR2000EA V12.00(12.10) 22:21:12 08-Jul-98

-----Instrument Settings-----

Test time = 180.00 m.m

Set-point Temp = 140.0 C

Initial Filter = 7

-----Data-point calculator-----

Final trend threshold = +/- 0.5 dNm/min

RI1 Overcure factor = 0.0

MDR:9802:1:10:JMB

MDR2000EA

=====End-test trig=====

22:21:12 08-Jul-98

MULTI-TRAY

Tray: 1

Position:10

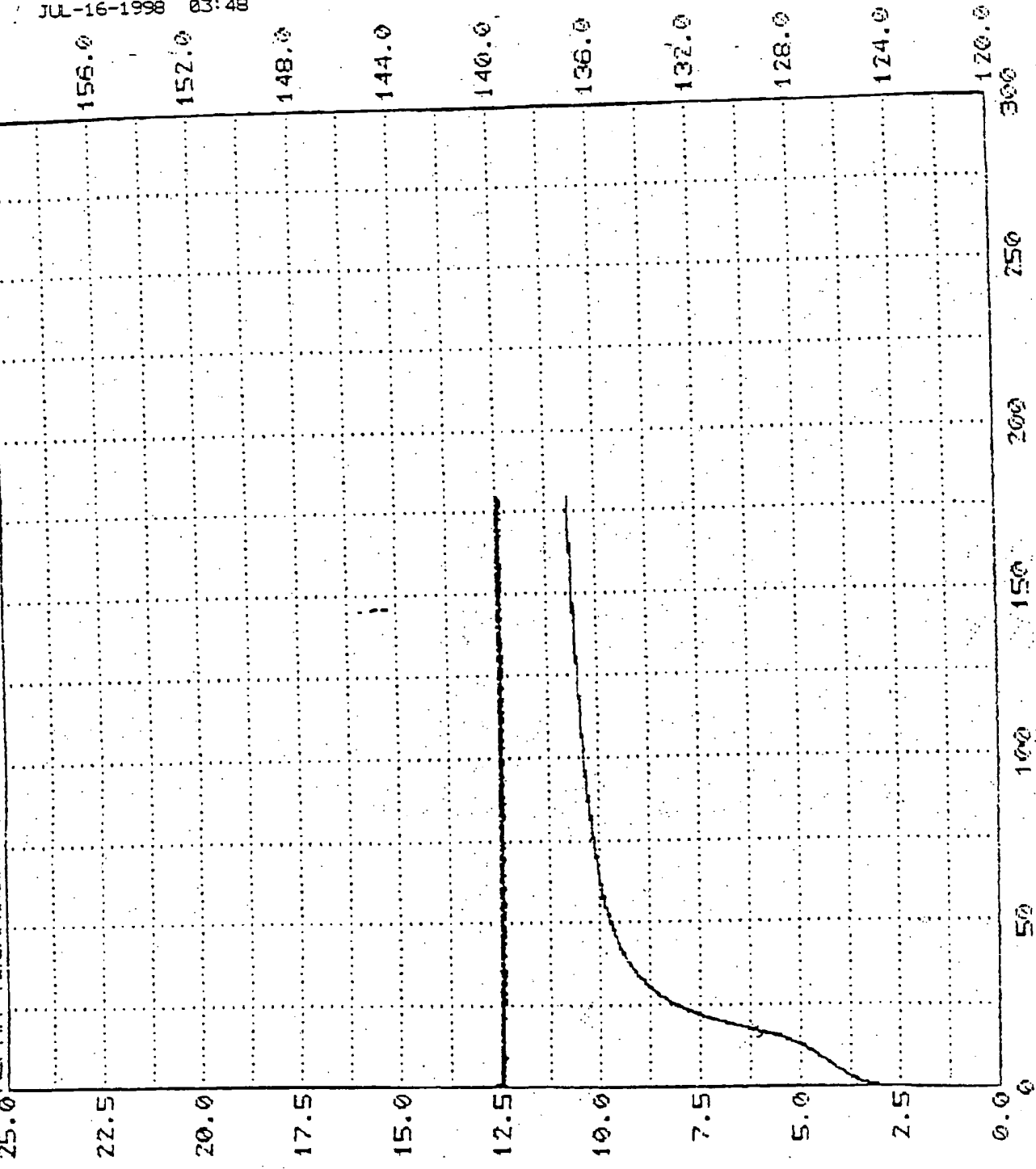
	time m.m	s° dNm	rate dNm/min	temp s C	temp l C	s° dNm	tan.delta	ril %	trend
INITIAL:	0.06	3.45	.	138.5	133.6	2.53	0.733	.	.
MINIMUM:	0.36	3.03	0.4	139.5	139.5	1.49	0.492	.	.
MAXIMUM:	179.85	10.74	0.1	140.0	140.0	0.76	0.071	.	.
MAX-MIN:	178.89	7.71	.	.	.	.	.	.	.
SCORCH1:	5.28	4.03	0.2	140.0	140.0	1.59	0.384	.	.
SCORCH2:	13.17	5.03	0.2	140.0	140.0	1.62	0.322	.	.
SCORCH3:	24.72	6.03	0.3	140.0	140.0	1.66	0.132	.	.
SCORCH10:		13.03	.	.	.	.	.	.	.
TPPOINT18:	3.47	3.80	0.2	140.0	140.1	1.57	0.413	.	.
TPPOINT20:	9.90	4.57	0.1	140.0	140.0	1.63	0.356	.	.
TPPOINT25:	12.69	4.85	0.2	140.0	140.0	1.62	0.327	.	.
TPPOINT30:	14.65	5.33	0.2	140.0	140.0	1.58	0.256	.	.
TPPOINT40:	17.43	6.11	0.3	140.0	140.1	1.43	0.234	.	.
TPPOINT50:	19.82	6.88	0.3	140.0	140.0	1.27	0.185	.	.
TPPOINT60:	22.23	7.85	0.2	140.0	140.0	1.13	0.147	.	.
TPPOINT70:	27.56	8.62	0.0	140.0	140.0	0.99	0.118	.	.
TPPOINT80:	34.32	9.15	0.0	140.0	140.0	0.87	0.095	.	.
TPPOINT90:	50.27	9.86	0.0	140.0	140.0	0.78	0.079	.	.
FINAL:	180.00	10.74	0.1	140.0	140.0	0.77	0.072	.	plateau
PEAK RATE:	0.36	3.20	0.5	140.2	140.2	.	.	100.0	.
REVERSION:	.	.	.	.	.	.	.	.	.
PEAK S°:	9.25	4.48	.	.	.	1.64	0.365	.	.

MDR 2000E

ALPHA TECHNOLOGIES

JUL-16-1998 03:48

T O R Q U E S' d N M



TIME (MIN)

22:21:12 08-Jul --

MDR:5502:1:10:JMB

9802036-1

12' @ 160°C

=====End-test trig=====

TEST DESCRIPTION: MDR2000EA V12.00(12.10) 04:25:10 09-Jul-98

-----Instrument Settings-----

Test time = 120.00 m.m Set-point Temp = 160.0 C

Initial Filter = 7

-----Data-point calculator-----

Final trend threshold = +/- 0.5 dNm/min

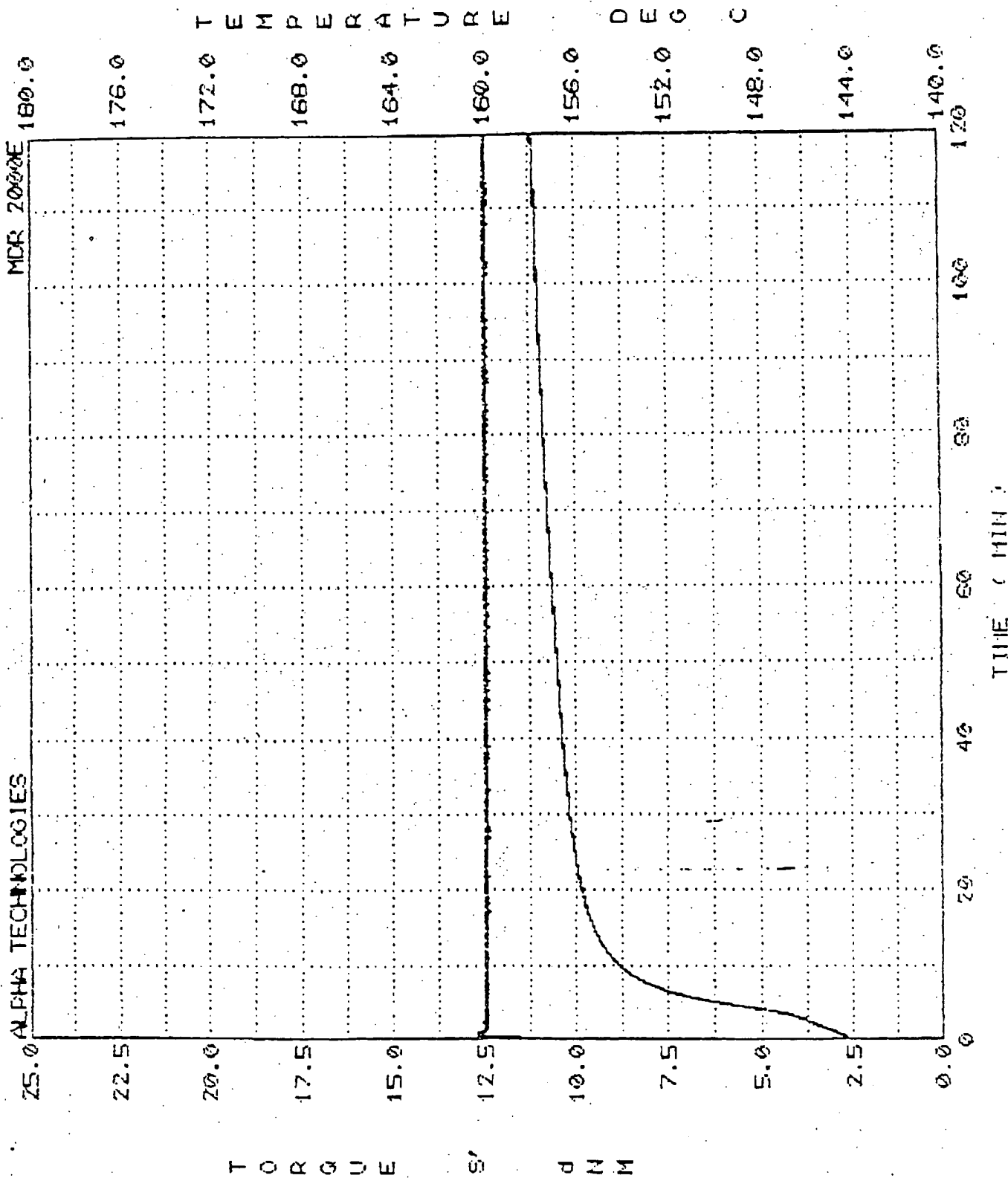
Ril Overcure factor = 0.0

=====End-test trig=====

MDR:9802:1:12:JMB MDR2000EA 04:25:10 09-Jul-98

MULTI-TRAY Tray: 2 Position: 3

	time m.m	s' dNm	rate dNm/min	temp u C	temp l C	s' tan.delta dNm	ril X	trend
INITIAL:	0.10	3.12	.	157.2	157.2	1.77	0.588	.
MINIMUM:	0.34	2.73	0.3	158.3	158.3	1.50	0.550	.
MAXIMUM:	119.77	11.20	0.0	160.0	160.0	0.78	0.068	.
MAX-MIN:	119.43	8.47	.	.	.	.	.	.
SCORE#01:	2.44	3.73	0.5	160.0	160.0	1.60	0.429	.
SCORE#02:	3.87	4.73	1.1	160.0	160.0	1.53	0.327	.
SCORE#03:	6.87	7.73	0.8	160.0	160.0	1.08	0.140	.
SCORE#10:		12.73	-----	-----	-----	-----	-----	.
TPPOINT10:	2.11	3.67	0.5	160.1	160.1	1.59	0.445	.
TPPOINT20:	3.54	4.41	1.0	160.0	160.0	1.59	0.360	.
TPPOINT25:	3.97	4.84	1.3	160.0	160.0	1.53	0.316	.
TPPOINT30:	4.36	5.27	1.4	160.0	160.0	1.47	0.279	.
TPPOINT40:	4.94	6.11	1.2	160.0	160.1	1.33	0.218	.
TPPOINT50:	5.78	6.98	0.9	160.0	160.1	1.20	0.172	.
TPPOINT60:	7.00	7.81	0.5	160.1	160.0	1.08	0.136	.
TPPOINT70:	9.23	8.65	0.3	160.0	160.0	0.95	0.110	.
TPPOINT80:	14.59	9.50	0.1	160.0	160.0	0.85	0.090	.
TPPOINT90:	37.24	10.35	0.0	160.0	160.0	0.81	0.079	.
FINAL:	120.04	11.19	0.0	160.0	160.0	0.78	0.068	plateau
PEAK RATE:	4.62	5.70	1.5	160.1	160.0	.	.	.
INVERSION:	.	.	.	.	.	.	190.0	.
PEAK S':	2.64	3.92	.	.	.	1.62	0.413	.



MDR:9902:1:12:JMB

04:25:10 03-Jul-98

RECEIVED JUL 29 1998

Witco Corporation
OrganoSilicones Group
3500 South State Route 2
Friendly, WV 26146
(304) 652-8000

Dear Customer,

Thank you for placing your sample request with Witco OrganoSilicones Group. We would like to take this opportunity to tell you about our company and products.

Witco Corporation is a \$2.3 billion manufacturer of high value specialty chemicals for a wide range of applications and markets around the world. The OrganoSilicones Group products consist of:

- Silquest® Silanes
- Silwet® Surfactants
- SAG® Foam Control Agents
- Silicone Organommodified Oils
- Silicone Fluids
- Silicone Emulsions
- Niax® Amine Catalysts
- Niax® Silicone Surfactants
- Geolite® Modifiers
- Niax® Color Stabilizers
- Niax® Ester Stabilizers

Our major production facilities in Friendly, West Virginia; Termoli, Italy and Antwerp, Belgium are ISO 9002 registered by Underwriters Laboratories, Inc. We have additional production facilities, warehouses and sales offices located around the world.

Our Order Fulfillment Group consisting of Customer Service, Plant Distribution, Supply Management and Logistics work together as a team to ensure that Witco meets your expectations and provides excellent service to you for every shipment.

We hope that this sample shipment has met your expectation for quality, delivery and performance. If for any reason you are not satisfied with any part of our service, please call our Customer Service Order Management Group at 1-800-523-5862 or for our International Group call 304-746-1625 and let us discuss the problem with you. Our goal is to be a "World Class" Supplier fulfilling your needs.

Again thanks for letting us serve you and we look forward to continued business with you and your company. Our Worldwide Literature hotline is 1-800-295-2392 or 607-786-8131.

Sincerely,

Witco OrganoSilicones Order Fulfillment Team

07/27/98

AKRON RUBBER
ATTN MSDS COORDINATOR
2887 GILCHRIST ROAD
AKRON

OH 44305

Dear Customer:

OSi Specialties, Inc., a subsidiary of Witco Corporation, is pleased to enclose for your use the following Material Safety Data Sheet (MSDS) which contains health and safety information. This takes preference over and supersedes any previous Material Safety Data Sheet you may have for this product.

The enclosed MSDS is being supplied to you pursuant to the requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA), 40 CFR Part 372. Please note that if you repackage or otherwise redistribute this product, this information should be sent to the recipients.

MSDS's contain valuable health and safety information which you should use in hazard communication and training programs for your employees as required of employers under the OSHA Hazard Communication Standard (29 CFR 1910.1200). We urge you to send this MSDS to the individuals in your organization responsible for health and safety practices, and to notify your employees, customers, agents, and contractors of the information so that they will be fully informed regarding health, safety and environmental protection measures.

If you have any questions or require additional information in the storage, handling, use or disposal of our product, please contact us.

Becky Swords
Product Safety / MSDS Coordinator
(304) 652-8000 ext. 8873

Attachment
Customer Code: 14753-AKRON OH

MATERIAL SAFETY DATA SHEET

SDS Number: 03360
SDS Date: NOV-17-1997
Page Number: 1
Product Name: Silquest A-1120 silane

SECTION I - PRODUCT AND COMPANY INFORMATION

Product Name: Silquest A-1120 silane
Hazard Rating: Health: 3 Fire: 1 Reactivity: 2 PPI: X
Company Identification: OSi Specialties, Inc.
One American Lane
Greenwich CT 06831-2559
Contact: Product Safety Department
Telephone/Fax: (304) 652-8000 (304) 652-1478
Emergency Phone (24 Hour): (800) 809-9998
(304) 926-8418
Toll-free (24 Hour): (800) 424-9300
Preparer: C. Sue Adcock (304) 652-8446
Product Safety Technologist

CHEMICAL NAME:
beta-(aminoethyl)-gamma-aminopropyltrimethoxysilane

FORMULA:
 $\text{H}_2(\text{CH}_2)_2\text{NH}(\text{CH}_2)_3\text{Si}(\text{OCH}_3)_3$

SECTION II - COMPOSITION/INFORMATION ON INGREDIENTS

Material--	--CAS Number--	---%---
beta-(aminoethyl)-gamma-aminopropyltrimethoxysilane	1760-24-3	> 70.00
related siloxanes and silane esters	None	< 30.00
methanol	67-56-1	< 3.00
ethylenediamine	107-15-3	< 2.00

NOTES:
Additional methanol may be formed by reaction with moisture.
See Section X for chemicals appearing on Federal or State
Right-To-Know lists.

OCCUPATIONAL EXPOSURE LIMITS:

OSi Specialties, Inc. 24-HR Emergency Phone: 1-800-809-9998 or 1-304-926-8418.

For commercial or technical information, please call 1-800-523-5862.

MATERIAL SAFETY DATA SHEET

SDS Number: 03360
SDS Date: NOV-17-1997
Revision Number: 2
Product Name: Silquest A-1120 silane

ethanol: 200 ppm TWA (skin), OSHA & ACGIH
250 ppm STEL (skin), OSHA & ACGIH
thylenediamine: 10 ppm TWA, OSHA
10 ppm TWA (skin), ACGIH

SECTION III - PHYSICAL DATA (Determined on Typical Material)

Form:	Liquid
Appearance/Color:	Clear, pale
odor:	Amine
Solubility (in water):	Reacts rapidly
Flash Value:	Not Available
Boiling Point (at 760 mmHg):	259.°C (498.2°F)
Vapor Pressure (mmHg):	< 1.0 @ 20.°C (68.°F)
Freezing Point:	< 0.°C (32.°F)
Evaporation Rate:	Slower than n-Butylacetate
Vapor Density:	Heavier than air
Density:	1.03
Molecular Weight:	222.4

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point:	280.°F (137.78°C)
	Pensky-Martens Closed Cup ASTM D 93
Explosive Range:	Not Available

SPECIAL FIRE FIGHTING PROCEDURES:

Do not direct a solid stream of water or foam into hot, burning pools; this may cause frothing and increase fire intensity.
Use self-contained breathing apparatus and body-covering protective clothing.

EXTINGUISHING MEDIA:

This material is reactive with water, but the reaction will not significantly increase fire severity. Apply alcohol-type or all-purpose-type foam by manufacturer's recommended techniques for large fires. Use carbon dioxide or dry chemical media for small fires.

UNUSUAL FIRE AND EXPLOSION HAZARDS:
None.

SECTION V - HEALTH HAZARD DATA

Si Specialties, Inc. 24-HR Emergency Phone: 1-800-809-9998 or 1-304-926-8418.

For commercial or technical information, please call 1-800-523-5862.

MATERIAL SAFETY DATA SHEET

MSDS Number: 03360
MSDS Date: NOV-17-1997
Page Number: 3
Product Name: Silquest A-1120 silane

EFFECTS OF SINGLE OVEREXPOSURE:

SWALLOWING:

May cause nausea, abdominal pain, vomiting, headache, dizziness, shortness of breath, weakness, fatigue, leg cramps, restlessness, confusion, drunken behavior, visual disturbances, drowsiness, coma, and death. There may be a delay of several hours between swallowing methanol and the onset of signs and symptoms. The effects observed are in part due to acidosis and partially to cerebral edema. Visual effects include blurred vision, diplopia, changes in color perception, restriction of visual fields, and complete blindness. Ingestion of moderate quantities of methanol also produces metabolic acidosis. Onset of symptoms may be delayed up to 48 hours. 60-200 ml of methanol is a fatal dose for most adults. Ingestion of as little as 10 ml has caused blindness. With massive overdoses, liver, kidney, and heart muscle injuries have been described.

SKIN ABSORPTION:

No evidence of harmful effects from available information.

INHALATION:

Short-term harmful health effects are not expected from vapor generated at ambient temperature. However, this material is capable of forming methanol if hydrolyzed. Methanol vapor may cause dizziness, drowsiness, disturbance of vision, and tingling, numbness and shooting pains in the hands and forearms.

SKIN CONTACT:

May cause minor irritation with itching and possible slight local redness.

EYE CONTACT:

Causes severe irritation, experienced as discomfort or pain, excess blinking and tear production, marked excess redness and swelling of the conjunctiva, and chemical burns of the cornea.

EFFECTS OF REPEATED OVEREXPOSURE:

Long-term repeated overexposure to methanol vapor concentrations of 3000 ppm or greater may allow a cumulative effect to occur with resulting nausea, vomiting, headache, ringing in the ears, insomnia, trembling, unsteady gait, vertigo, clouded and double vision. Liver and/or kidney injury may occur. Prolonged overexposure at levels of 800-1000 ppm may result in severe eye damage in some persons.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE:

Specialties, Inc. 24-HR Emergency Phone: 1-800-809-9998 or 1-304-926-8418.

For commercial or technical information, please call 1-800-523-5862.

MATERIAL SAFETY DATA SHEET

SDS Number: 03360
SDS Date: NOV-17-1997
Page Number: 4
Product Name: Silquest A-1120 silane

skin contact may aggravate an existing dermatitis.
may aggravate an existing liver or kidney disease.

IGNIFICANT LABORATORY DATA WITH POSSIBLE RELEVANCE TO HUMAN HEALTH
HAZARD EVALUATION:
None currently known.

OTHER EFFECTS OF OVEREXPOSURE:

Inhalation of ethyleneamines may cause sensitization of the respiratory tract and the development of an asthmatic reaction on further exposure. There may be susceptible* individuals who develop long-term hyperreactive airways, asthma and other respiratory injury following exposure to extremely low concentrations of ethyleneamines, even below the irritation threshold. Other respiratory irritants may produce a reaction in individuals whose airways have become hyperreactive. Since there are no definitive screening methods available to identify susceptible individuals, we suggest that people with asthma, or other longstanding respiratory conditions (for example, chronic bronchitis, emphysema, etc.) should be protected from any potential exposure to ethyleneamines. Skin contact may cause sensitization and an allergic skin reaction.

Cross-sensitization may occur by skin contact with this material and other amines.

EMERGENCY AND FIRST AID PROCEDURES:

SWALLOWING:

If patient is fully conscious, give two glasses of water. Induce vomiting. Obtain medical attention without delay. If medical advice is delayed, and if the person has swallowed a moderate volume of material (a few ounces), then give three to four ounces of hard liquor, such as whiskey. For children, give proportionally less liquor, according to weight.

SKIN:

Remove contaminated clothing. Wash skin with soap and water. If irritation persists or if contact has been prolonged, obtain medical attention.

INHALATION:

Move to fresh air. Give artificial respiration if not breathing. If breathing is difficult, oxygen may be given by qualified personnel. Obtain medical attention.

EYES:

Specialties, Inc. 24-HR Emergency Phone: 1-800-809-9998 or 1-304-926-8418.

For commercial or technical information, please call 1-800-523-5862.

MATERIAL SAFETY DATA SHEET

SDS Number: 03360
SDS Date: NOV-17-1997
Age Number: 5
Product Name: Silquest A-1120 silane

Immediately flush eyes with water and continue washing for several minutes.
Obtain medical attention.

NOTES TO PHYSICIAN:

This product reacts with moisture in the acid contents of the stomach to form ethanol. The combination of visual disturbances, metabolic acidosis, and formic acid in the urine is evidence of methanol poisoning. The therapeutic intravenous administration of ethanol (10 ml per hour) allows it to be preferentially oxidized and reduces production of methanol metabolites. Acidosis must be treated by means of intravenous sodium bicarbonate and ethanol elimination may be increased by hemodialysis, as indicated. Treatment should be based on blood methanol levels and acid-base balance. Folate may be administered to enhance the metabolism of formaldehyde. 4-Methyl pyrazole has been suggested as an antidote: because of its' alcohol dehydrogenase inhibiting effects, it reduces the production of formate and the development of metabolic acidosis. However, the value of this antidote remains to be proven in humans.

SECTION VI - STABILITY AND REACTIVITY DATA

Stability: This product is stable
Hazardous Polymerization: Hazardous polymerization will not occur

Stability (CONDITIONS TO AVOID):
None known.

INCOMPATIBILITY (MATERIALS TO AVOID):

Reaction with water or other aqueous media is rapid and exothermic. The addition of small amounts of water (in the range of 2-15%) can produce an exothermic reaction which generates alcohol, to the extent that the resulting solution can reach a temperature which exceeds the flash point of the new solution. If a water solution is desired, add the product to water, and not vice versa.

HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS:

Burning can produce the following combustion products:
Gases of carbon, nitrogen, and silicon.
Carbon monoxide is highly toxic if inhaled; carbon dioxide in sufficient concentrations can act as an asphyxiant.
Prolonged overexposure to the products of combustion may result in irritation of the respiratory tract.

Specialties, Inc. 24-HR Emergency Phone: 1-800-809-9998 or 1-304-926-8418.

For commercial or technical information, please call 1-800-523-5862.

MATERIAL SAFETY DATA SHEET

SDS Number: 03360
SDS Date: NOV-17-1997
Page Number: 6
Product Name: Silquest A-1120 silane

HAZARDOUS POLYMERIZATION (CONDITIONS TO AVOID):
None known.

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:
Small spills can be flushed with large amounts of water; larger spills should be collected for disposal.
Wear suitable protective equipment.
Avoid contact with eyes.

WASTE DISPOSAL METHOD:
Incinerate in a furnace where permitted under Federal, State, and local regulations.

SECTION VIII - EXPOSURE CONTROLS/PERSONAL PROTECTION

RESPIRATORY PROTECTION:
Use self-contained breathing apparatus in high vapor concentrations.

VENTILATION:
General (mechanical) room ventilation is expected to be satisfactory. However, special ventilation may be needed if material is mixed (reacted) with water.

PROTECTIVE GLOVES:
Recommended order of use:

1
Nitrile
Neoprene
Latex
VC-coated

EYE PROTECTION:
Safety goggles

OTHER PROTECTIVE EQUIPMENT:
Emergency Bath, Safety Shower
Chemical Apron

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:

Si Specialties, Inc. 24-HR Emergency Phone: 1-800-809-9998 or 1-304-926-8418.

For commercial or technical information, please call 1-800-523-5862.

MATERIAL SAFETY DATA SHEET

SDS Number: 03360
SDS Date: NOV-17-1997
Page Number: 7
Product Name: Silquest A-1120 silane

----- DANGER!

May cause asthma with possible long-term lung damage.
Harmful or fatal if swallowed.
Causes eye burns.
May cause eye damage and blindness if swallowed.
May cause allergic skin reaction.
Cross-sensitization to other amines may occur.
May cause dizziness and drowsiness.
May cause heart muscle damage.
May cause liver and kidney damage.

Do not swallow.
Do not get in eyes.
Avoid breathing vapor.
Keep container closed.
Use with adequate ventilation.
Avoid prolonged or repeated contact with skin.
Wash thoroughly after handling.

OTHER PRECAUTIONS:

DANGER!! Harmful or fatal if swallowed, due to methanol production in the stomach.

OTHER HAZARDS:

Large spill could be toxic to fish; avoid discharge to natural waters.

If this product is mixed with water, methanol will be formed; methanol vapors are toxic and flammable, so special ventilation may be needed.

SECTION X - REGULATORY INFORMATION

----- **** STATUS ON SUBSTANCE LISTS ****

The concentrations shown are maximum or ceiling levels (weight %) to be used for calculations for regulations. Trade Secrets are indicated by "TS".

***** FEDERAL EPA *****

>> COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT OF 1980 (CERCLA) <<< requires notification of the National Response Center of release of quantities of hazardous substances equal to or greater than the following:

Sil Specialties, Inc. 24-HR Emergency Phone: 1-800-809-9998 or 1-304-926-8418.

For commercial or technical information, please call 1-800-523-5862.

MATERIAL SAFETY DATA SHEET

SDS Number: 03360
SDS Date: NOV-17-1997
Age Number: 8
Product Name: Silquest A-1120 silane

0 or greater than the reportable quantities (RQ's) in 40CFR302.4.
Components present in this product at a level which could require
reporting under the statute are:

HEMICAL	CAS NUMBER	UPPER BOUND CONC., %
***** NONE *****		

>> SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (SARA)
TITLE III <<< requires emergency planning based on Threshold
Planning Quantities (TPQ's) and release reporting based on Reportable
Quantities (RQ's) in 40CFR355 (used for SARA 302, 304, 311 and 312).
Components present in this product at a level which could require
reporting under the statute are:

HEMICAL	CAS NUMBER	UPPER BOUND CONC., %
Ethylenediamine	107-15-3	2.00

>> SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (SARA)
TITLE III <<< requires submission of annual reports of release of
toxic chemicals that appear in 40CFR372 (for SARA 313). This
information must be included in MSDS's that are copied and distributed
for this material.
Components present in this product at a level which could require
reporting under the statute are:

HEMICAL	CAS NUMBER	UPPER BOUND CONC., %
Ethanol	67-56-1	3.00

> TOXIC SUBSTANCES CONTROL ACT (TSCA) STATUS <<<
The ingredients of this product are listed on the TSCA inventory or are
exempt.

***** STATE RIGHT-TO-KNOW *****

> CALIFORNIA PROPOSITION 65 <<<
This product contains TOLUENE (<50 ppm) which the State of California has
found to cause birth defects or other reproductive harm. (Toluene appears on
the 1/1/91 repro-toxicant list.)

Specialties, Inc. 24-HR Emergency Phone: 1-800-809-9998 or 1-304-926-8418.

For commercial or technical information, please call 1-800-523-5862.

MATERIAL SAFETY DATA SHEET

MSDS Number: 03360

MSDS Date: NOV-17-1997

Page Number: 9

Product Name: Silquest A-1120 silane

>> MASSACHUSETTS RIGHT-TO-KNOW, SUBSTANCE LIST (MSL) <<<
HAZARDOUS SUBSTANCES and EXTRAORDINARILY HAZARDOUS SUBSTANCES on the
MSL must be identified when present in products.
Components present in this product at a level which could require
reporting under the statute are:

CHEMICAL	CAS NUMBER	UPPER BOUND CONC., %
Ethylenediamine	107-15-3	2.00
Methanol	67-56-1	3.00

>> PENNSYLVANIA RIGHT-TO-KNOW, HAZARDOUS SUBSTANCE LIST <<<
HAZARDOUS SUBSTANCES and SPECIAL HAZARDOUS SUBSTANCES on the list
must be identified when present in products.
Components present in this product at a level which could require
reporting under the statute are:

CHEMICAL	CAS NUMBER	UPPER BOUND CONC., %
Methanol	67-56-1	3.00
Ethylenediamine	107-15-3	2.00

>> CALIFORNIA SCAQMD RULE 443.1 VOC'S <<<
Volatile Organic Components (VOC's) = Substances with vapor pressure of
=> 0.5 mmHg at 104°C (219.2°F).

This product contains 205.40 g/liter VOC's
and 205.40 g/liter VOC's (less water and exempt compounds).

>> NEW JERSEY WORKER AND COMMUNITY RIGHT-TO-KNOW ACT (LABELING
REQUIREMENTS) <<<

COMPONENT	CAS#
N-beta-(aminoethyl)-gamma-aminopropyl- trimethoxysilane	1760-24-3
N,N'-Bis(trimethoxysilylpropyl)di- aminoethane	None
Methanol	67-56-1
Ethylenediamine	107-15-3
Disiloxanes	None

Si Specialties, Inc. 24-HR Emergency Phone: 1-800-809-9998 or 1-304-926-8418.

For commercial or technical information, please call 1-800-523-5862.

MATERIAL SAFETY DATA SHEET

MSDS Number: 03360

MSDS Date: NOV-17-1997

Page Number: 10

Product Name: Silquest A-1120 silane

OTHER REGULATORY INFORMATION:

PA Hazard Categories: Immediate Health Hazard
Delayed Health Hazard

REVISED SECTIONS:

MSDS was reviewed and active date changed.

NOTES:

Silquest is a registered trademark of OSi Specialties, Inc.
Copyright 1997 OSi Specialties, Inc.

OSi Specialties urges each customer or recipient of this MSDS to study it carefully to become aware of and understand the hazards associated with the material. The reader should consider consulting reference works or individuals who are experts in ventilation, toxicology, and fire prevention, as necessary, to appropriately use and understand the data contained in this MSDS. To promote safe handling, each customer or recipient should: (1) notify its employees, agents, contractors and others whom it knows or believes will use this material or the information in this MSDS and any other information regarding hazards or safety; (2) furnish this same information to each of its customers for the material; and (3) request its customers to notify their employees, customers, and other users of the material of this information. The opinions expressed herein are those of qualified experts with OSi Specialties. We believe that the information contained herein is current as of the date of this MSDS. Since the use of this information and the conditions of use of the material are not under the control of OSi Specialties, it is the user's obligation to determine the conditions of safe use of the material.

Abbreviations: TS = Trade Secret
MSDS = Material Safety Data Sheet
TLV = Threshold Limit Value
TWA = Time Weighted Average

Health Hazard Rating: 4 - Severe hazard
3 - Serious hazard
2 - Moderate hazard

OSi Specialties, Inc. 24-HR Emergency Phone: 1-800-809-9998 or 1-304-926-8418.

For commercial or technical information, please call 1-800-523-5862.

MATERIAL SAFETY DATA-SHEET

MSDS Number: 03360

MSDS Date: NOV-17-1997

Page Number: 11

Product Name: Silquest A-1120 silane

1 - Slight hazard

0 - Minimal hazard

X - Personal protection rating to be supplied
by user depending on use conditions.

Printed in USA

Specialties, Inc. 24-HR Emergency Phone: 1-800-809-9998 or 1-304-926-8418.

For commercial or technical information, please call 1-800-523-5862.

ADVANCED SPECIALTY GAS EQUIPMENT CORP
11 LACKLAND DR
MIDDLESEX NJ 08846

Page
1

Project No.
18-66917

TOP - SALES SAMPLE ACCT.
25111 COUNTRY CLUB BLVD.
SUITE 265
RD. ULMASTED OH 44070

S MR SCOTT YATES
H A.R.D.L.
1 2887 GILCHRIST RD
P AKRON OH 44305

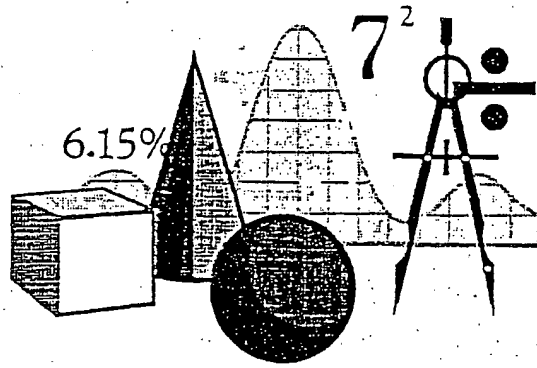
Customer Code 73249100 P.O./Release No. 143259464 Special Handling
Order Date 7/29/98 Ship Via UPS GROUND F O B: MIDDLESEX NJ

Qty	Regstl	Product Code	Description	Storage	U/M	Qty	Uty
Ord	Date			Area		Ship	Picked
21	7/29/98	1605MS1001	13A MULE SIEVE POWDER 15 LB CAN	ASSEMBLD	EAL	2	
21	7/29/98	1605MS1328	13X MULE SIEVE POWDER 15 LB CAN	ASSEMBLD	EAL	2	

RECEIVED JUL 31 1998

***** ALL LINE ITEMS ON THE ORDER WERE PRINTED *****

Weight & Handling
of PKGS. 1 Via UPS G. Wt. LBS.
Packed By [Signature] Inspector Shipped Date 7-29-98



PLASTICS PN REQUISITION

Requested By: SWAYATES Date: 8 12 98

Customer: M E K ASSOCIATES Technician: MAM/SWY/BJC

Contact: MEL AUERBACH PO # TO FOLLOW

Address: 10242 DAYFLOWER DR.
TWINSBURG OH 44087

Telephone Number: (330) 963-5467

Fax Number: (330) 963-0479

Is this foreign? Y N

Subject: MIXING / EXTRUDING RUBBER COMPOUNDS / PHYSICAL PROPERTIES
OF RUBBER COMPOUNDS

Received: CUSTOMER TO DELIVER SAMPLES FOR RUBBER MIXING &
COMPOUNDING TUES, AUG 18

Due Date: _____ Costs: ^{TO BE DETERMINED} NOTE 2,000 Departments? 2 3 4 7 8 10
Special Instructions/Comments: ^{initially per sy}

LABELED BY CUST.

RUBBER SAMPLES WILL BE ~~TESTED~~ AFTER MIXING &
COMPOUNDING

TO: BOB MAY

FROM: SCOTT YATES

Bob, I talked with my customer and he gave me this basic formula for the masterbatch we will be running on the Banbury.

Butyl 065 & crosslinkable Butyl
(customer is bringing the rubber)

Carbon Black N330 451

Polybutene #300

Total

366 grams

420

406 grams

136 grams

156

908 grams (2 lbs)

160.00
160.93
37.16
248.09

1042 gms
2.28 lbs

I will also need some Zinc Oxide and Sunpar oil to bring back to Gilchrist for when we finish mixing these compounds in our Brabender mixer.

I'll call you tomorrow to check on things.

Thanks

Scott

WEIGHED 803 8-18-98



9/18/98

Spec

MB-8433	140.1
G	18.0
H	9.0
1315	72.0
2280	48.6
AC	25.2
3A MS	33.6
13X MS	12.0
ZnO	0.6

Time

Temp

RPM

Comments

added MB

- Put on roller mill
- Press to thickness needed
- Diameter / cut samples for $T \times E$
- $T \times E$ on 1 day
- Diameter for 7 days
- $T \times E$ at 7 days

$$4.5 \times 5.125 \times 3.25 = 75 \text{ lb}^3$$

$$\sim 33 \text{ lb} = 150 \text{ gm}$$

$$\begin{array}{r} 150 \\ .8 \\ \hline 120.9 \end{array}$$

MB	-	38.90
Pentalyn G	-	5.00
Pentalyn H	-	2.50
Econ 1315	-	20.00
Sumpas 2280	-	13.50
AC Black	-	7.00
3A MS	-	9.30
13X MS	-	3.30
Silane	-	0.50

46.68
6.00
3.00
24.00
16.20
8.40
11.16
3.96
0.60
<u>120.00 gm</u>

Batch Size	3X
46.7g	140.1
6.0g	18.0
3.0g	9.0
24.0g	72.0
16.2g	48.6
8.4g	25.2
11.2g	33.6
4.0g	12.0
0.6g	1.8
<u>120.1</u>	<u>360.1</u>

add 0.6g ZnO - need to set temperature controls properly
 based on - " " get bid for mixer
 1pt ZnO - " " run 3X batch size
 100 lbs water - keep track of Temp & RPM
 at < 230°F

184

INTERDEPARTMENTAL PROJECT FOR COMPOUNDING & MIXING DEPT.

Date 9/22/98 Customer MCK ASSOC. PN 33094

From Dept. 7 ARDL Requester S YATES

Rubber _____ Plastics _____ No. of Compounds 2 Recipe(s) Included¹ _____

Normal Service _____ Rush _____ Date Needed _____

REQUEST FOR:

- ☐ Black ☐ Non-Black
- ☐ Compounding/Mixing ☐ Banbury ☐ Power Curves ☐ Milling
- ☐ Mooney @ _____ °F/°C ☐ Rheometer @ _____ °F/°C ☐ Cure Samples² @ _____ °F/°C for _____ mins.
- ☐ Extrusion, Type _____, Conditions _____ ☐ Autoclave, Time _____, Temp. _____ °F/°C

OTHER INSTRUCTIONS

✓ COLD PRESS 2 COMPOUNDS INTO SLABS DAW
9-22-98

☐ Copy of Quotation Attached

Dept. 4 Invoice Amount \$ 150⁰⁰

Draft Report: Yes _____ No _____ By Date (if yes) _____

NOTES

¹List Compound Formulation(s) on Back

²List type of samples (if more than one) and cure conditions under "OTHER INSTRUCTIONS"

ARDL Invoice Worksheet

8/12/98 2:08:36 PM

DATE MAILED:

9/29/98

PN NUMBER:

33094

Customer Code:

2829

For Customer:

M & K ASSOCIATES

Mr. Mel Auerbach

10242 DAYFLOWER DRIVE

EST \$:

\$2,000.00

TWINSBURG

OH 44087

CUST PO:

To Follow

PHONE 330-963-5467

FAX 330-963-0479

BILL TO 10242 DAYFLOWER DRIVE

TWINSBURG

OH 44087

DATE REC:

8/12/98

DEP CODE:

7, 3, 4

P/N DATE:

8/12/98

DUE DATE:

8/31/98

SUBJECT:

NEW CUSTOMER***INTERDEPARTMENT***Mixing/Extruding Rubber Compounds/Physical Properties of Rubber Compounds to the attached paperwork.

RECEIVED:

M & K Associates to deliver samples for Rubber Mixing and Compounding 8/18/98.

LABORATORY CHARGES

ITEM	DESCRIPTION	DEP	# SAMPLES	STD. \$	\$ CREDIT
1	BANQUAY MIXING	4	2	\$500.00	
2	PEEL/TEAR TEST	7	2	\$125.00	

RELATED EXPENSES:

ITEM	DESCRIPTION	AMOUNT	\$ AMOUNT

TOTAL LABORATORY CHARGE: \$ 625.00

TOTAL EXPENSES

TOTAL INVOICE:

\$ 625.00

PARTIAL BILLING
ONGOING PROJECT

SWY

PARTIAL
BILLING
ONGOING
PROJECT

DRAFT

Page 1 of 1, PN# 33094

September 29, 1998

Mr. Mel Auerbach
M & K Associates
10242 Dayflower Drive
Twinsburgh, OH 44087

SUBJECT: Mixing Rubber compounds and testing physical properties.

RECEIVED: Samples for rubber mixing and compounding.

TEST METHODOLOGY:

TEAR PROPERTIES ASTM D624-91

Speed: 2.00 in/min.

Sample Type: 1 in.² sample placed between two slabs of glass.

RESULTS:

<u>Sample I.D.</u>	<u>Results, N/m (lbf/in.)</u>
065	7368 (42.1)
8433	6711 (38.3)



Melissa A. Martin
Project Technician

AKRON RUBBER DEVELOPMENT LABORATORY, INC.
PN# 33094 INV# 73309401

Barbara J. Gedeon
Manager - Plastics Testing Division



PN#: 33094
Customer: M K Assoc
Material ID:
Miscellaneous:
Specimen #: 01

Name: mam
Test Type: tear
Test Name: TEAR DIE C 2 in min
Test Date: 10-14-98
Test Time: 10.00.20

Sample 001

Version PV6.05/MV2.06 Test code: 61006
Serial Number:
Tear General Purpose
Number of Specimens: 2 / 5
Sample type: trouser
Method used:
Loadcell: 1000N 100kgf 200lbf (Range: 500 N)
Extension measured by: crosshead
Stage 1 speed: 2.00 in/min
Peak force threshold: 9.78608 N, Trough force threshold: 9.78608 N
Analyse all of X-range

Specimen details

	Thickness in	Range N	Utilisation %
Specimen 1	0.2030	500	50.00
Specimen 2	0.2260	500	50.00

Specimen results

	TEAR STRENGTH N/m	TEAR FORCE N
--	----------------------	-----------------

Specimen 1	17843	92.002
Specimen 2	9121	52.358

Multi-specimen results

	TEAR STRENGTH N/m	TEAR FORCE N
--	----------------------	-----------------

Median	13482	72.18
Average	13482	72.18
Range	8722	39.644

Ignore highest & lowest results: Disabled



PN#: 33094
Customer: M & K
Material ID: c
Miscellaneous:
Specimen #: 01

Name: mam
Test Type: tear
Test Name: TEAR DIE C 2 in min
Test Date: 10-20-98
Test Time: 10.58.50

Sample 001

Version PV6.05/MV2.06 Test code: 61006
Serial Number:
Tear General Purpose
Number of Specimens: 2 / 5
Sample type: trouser
Method used:
Loadcell: 1000N 100kgf 200lbf (Range: 500 N)
Extension measured by: crosshead
Stage 1 speed: 2.00 in/min
Peak force threshold: 9.78608 N, Trough force threshold: 9.78608 N
Analyse all of X-range

Specimen details

	Thickness in	Range N	Utilisation %
Specimen 1	0.2190	500	50.00
Specimen 2	0.2195	500	50.00

Specimen results

	TEAR STRENGTH N/m	TEAR FORCE N
Specimen 1	12950	72.036
Specimen 2	12469	69.519

Multi-specimen results

	TEAR STRENGTH N/m	TEAR FORCE N
Median	12710	70.7775
Average	12710	70.7775
Range	481.0	2.517

Ignore highest & lowest results: Disabled



Mel Auerbach

11/28/98

C-961-87 - Lap Shear 4.07

C-908-90 - Yield Strength 4.07

C-1135-90 - Tensile Adhesion 4.07

Leave sit for ~~2, 3, 5, 7~~ ^{1, 2, 3, 5, 7} days ^{+ then how much more}
at Room Temp. 1, 2, 3, 5, 7

Don't use side use for release
film

ASTM D897-? 15.06



ONGOING
PROJECT

ARDL Invoice Worksheet

8/12/98 2:08:36 PM

DATE MAILED:

11/1/98

PN NUMBER:

33094

Customer Code:

2829

For Customer:

M & K ASSOCIATES

Mr. Mel Auerbach

10242 DAYFLOWER DRIVE

EST \$:

\$2,000.00

TWINSBURG

OH 44087

CUST PO:

To Follow

PHONE 330-963-5467

DATE REC:

8/12/98

FAX 330-963-0479

DEP CODE:

7, 3, 4

BILL TO 10242 DAYFLOWER DRIVE

P/N DATE:

8/12/98

TWINSBURG

OH 44087

DUE DATE:

8/31/98

SUBJECT:

NEW CUSTOMER***INTERDEPARTMENT***Mixing/Extruding Rubber Compounds/Physical Properties of Rubber Compounds to the attached paperwork.

RECEIVED:

M & K Associates to deliver samples for Rubber Mixing and Compounding 8/18/98.

LABORATORY CHARGES

ITEM	DESCRIPTION	DEP	# SAMPLES	STO. \$	\$ CREDIT
1	1 MIX ON HAAKE MIXER	7	1	\$100.00	
2	PEEL TESTING	7	4	\$125.00 \$500.00	

RELATED EXPENSES:

ITEM	DESCRIPTION	AMOUNT	\$ AMOUNT
1	1" x 3" x 1/4" GLASS PLATES ARDL PO 13342	\$ 24.00	

TOTAL LABORATORY CHARGE:

\$ 600.00

TOTAL EXPENSES

\$ 24.00

TOTAL INVOICE:

\$ 624.00

FORMULA

11/6/98

A. Masterbatch 8433	140.1gm
B. Pentalyn G	18.0gm
C. Pentalyn H	9.0gm
D. Escorez 1315	72.0gm
E. Sunpar 2280	48.6gm
F. Acetylene Black	25.2gm
G. Molecular Sieve 3A	33.6gm
H. Molecular Sieve 13X	12.0gm
I. Zinc Oxide	1.2gm
	<u>359.7gm</u>

PROCEDURE

Weigh out all ingredients beforehand except the two molecular sieves which should be weighed out just before use (they will absorb moisture from the air if allowed to stand in the laboratory). The masterbatch is already made and can be used as is.

Mix material in the Haake mixer, preheating to 225 deg F before the first addition. Maintain a temperature of 225-250 deg F at all times by the use of external heat as necessary.

Take all subsequent temperature readings by the use of a thermometer inserted into the mix in addition to the temperature probe readings. Make sure to turn the mixer off before inserting the thermometer.

Adjust the RPM to make for an easy mix. This was very easy in the prior runs.

1. Add A with mixing; mix 5 minutes
2. Add B with mixing in 30-60 seconds
3. Add C with mixing in 30-60 seconds; mix 5 minutes when complete
4. Add D with mixing in 5-6 minutes; mix 5 minutes more when complete
5. Add E and F with mixing alternately to maintain a good mix; add in 5-7 minutes; mix 5-7 minutes more when complete; you will have to increase the RPM during this step
6. Add G and then H with mixing in 5-6 minutes; mix 10 minutes more and make sure it is homogeneous by the absence of any white streaks in the mix
7. Add I with mixing and make sure the temperature is below 225 deg F before the addition; mix 10 minutes more below 225 deg F
8. Stop mix and drop the material onto release paper.

¹Note: if any release chemical is used on the release paper, the surface of the material which comes in contact with the release chemical must not be a surface used for subsequent adhesion testing.

TESTING

All sample preparation should be made at the same time. Once samples are made, they should be conditioned at ambient laboratory conditions (please note). Testing will be

FORMULA

11/6/98

- A. Masterbatch 8433
B. Pentalyn G
C. Pentalyn H
D. Escorez 1315
E. Sunpar 2280
F. Acetylene Black
G. Molecular Sieve 3A
H. Molecular Sieve 13X
I. Zinc Oxide

140.1gm	1260.7
18.0gm	162.0
9.0gm	81.0
72.0gm	648.0
48.6gm	437.4
25.2gm	226.8
33.6gm	307.2
12.0gm	108.0
1.2gm	10.8
359.7gm	3237.3

X 2

Barbara GeLeon
330-794-6610

+ 1.8g Silane

PROCEDURE

Weigh out all ingredients beforehand except the two molecular sieves which should be weighed out just before use (they will absorb moisture from the air if allowed to stand in the laboratory). The masterbatch is already made and can be used as is.

Mix material in the Haake mixer, preheating to 225 deg F before the first addition. Maintain a temperature of 225-250 deg F at all times by the use of external heat as necessary.

Take all subsequent temperature readings by the use of a thermometer inserted into the mix in addition to the temperature probe readings. Make sure to turn the mixer off before inserting the thermometer.

Adjust the RPM to make for an easy mix. This was very easy in the prior runs.

Turn heat on and off to maintain 225 - 250° F

1. Add A with mixing; mix 5 minutes
2. Add B with mixing in 30-60 seconds
3. Add C with mixing in 30-60 seconds; mix 5 minutes when complete
4. Add D with mixing in 5-6 minutes; mix 5 minutes more when complete
5. Add E and F with mixing alternately to maintain a good mix; add in 5-7 minutes; mix 5-7 minutes more when complete; you will have to increase the RPM during this step
6. Add G and then H with mixing in 5-6 minutes; mix 10 minutes more and make sure it is homogeneous by the absence of any white streaks in the mix
7. Add I with mixing and make sure the temperature is below 225 deg F before the addition; mix 10 minutes more below 225 deg F
8. Stop mix and drop the material onto release paper.

Note: if any release chemical is used on the release paper, the surface of the material which comes in contact with the release chemical must not be a surface used for subsequent adhesion testing.

TESTING

All sample preparation should be made at the same time. Once samples are made, they should be conditioned at ambient laboratory conditions (please note). Testing will be

Make up sample as follows:

C908

- 1- as soon as possible after mfg
- 2- 24 hrs after 1st sample
- 3 - will decide based on first two results

PN#: 33094
 Customer: M K
 Material ID: 8433
 Miscellaneous: thick g
 Specimen #: 01

Name: bjg
 Test Type: tear
 Test Name: TEAR DIE C .5 in min re
 Test Date: 11-06-98
 Test Time: 15.43.30

Sample 001

Version PV6.05/MV2.06 Test code: 61006

Serial Number:

Tear General Purpose REANALYSIS MODE

Number of Specimens: 2 / 5

Sample type: trouser

Method used:

SPECIMEN DETAILS

Specimen 1 PN#: 33094 Customer: M K Material ID: 8433 Miscellaneous: thick g Specimen #: 01

Specimen 2 PN#: 33094 Customer: M K Material ID: 8433 Miscellaneous: thick g Specimen #: 02

Peak force threshold: 9.78608 N, Trough force threshold: 9.78608 N

Analyse all of X-range

Specimen details

Thickness
in

Specimen 1 0.6790

Specimen 2 0.6460

	TEAR STRENGTH N/m	TEAR FORCE N
--	----------------------	-----------------

Specimen 1	3682	63.499
------------	------	--------

Specimen 2	3610	59.241
------------	------	--------

Specimen results

$1 \div 4.4482$

lbs.

14.28

13.32

psi

14.28

13.32

(x 6894.8)

N/m²

98458

91839

Multi-specimen results

	TEAR STRENGTH N/m	TEAR FORCE N
--	----------------------	-----------------

Median	3646	61.37
--------	------	-------

Average	3646	61.37
---------	------	-------

Range	71.42	4.258
-------	-------	-------

Ignore highest & lowest results: Disabled

PN#: 33094
Customer: M K
Material ID: 065
Miscellaneous: thick g
Specimen #: 01

Name: bjg
Test Type: tear
Test Name: TEAR DIE C .5 in min re
Test Date: 11-06-98
Test Time: 15.44.38

Sample 002

29

Version PV6.05/MV2.06 Test code: 61006

Serial Number:

Tear General Purpose REANALYSIS MODE

Number of Specimens: 2 / 5

Sample type: trouser

Method used:

SPECIMEN DETAILS

Specimen 1 PN#: 33094 Customer: M K Material ID: 065 Miscellaneous: thick g Specimen #: 01

Specimen 2 PN#: 33094 Customer: M K Material ID: 065 Miscellaneous: thick g Specimen #: 02

Peak force threshold: 9.78608 N, Trough force threshold: 9.78608 N

Analyse all of X-range

Specimen details

Thickness
in

Specimen 1	0.6740
Specimen 2	0.6675

Specimen results

	TEAR STRENGTH N/m	TEAR FORCE N
--	----------------------	-----------------

Specimen 1	1830	31.334
Specimen 2	2129	36.094

7.044 lbs.
8.1143

48567
55946

Multi-specimen results

	TEAR STRENGTH N/m	TEAR FORCE N
--	----------------------	-----------------

Median	1980	33.714
Average	1980	33.714
Range	298.6	4.76

Ignore highest & lowest results: Disabled

PN#: 33094
Customer: M K
Material ID: 8344
Miscellaneous:
Specimen #: 01

Name: mam
Test Type: Plastics Testing Division Tensile Tests
Test Name: ASTM C908
Test Date: 11-24-98
Test Time: 13.38.26

Sample 002

Version PV6.05/MV2.06 Test code: 61004

Serial Number: 80SIC1072

Tension General Purpose

Number of Specimens: 2

Sample type: Type I Specimens

Method used: ASTM D 638-94b

User text:

Loadcell: 10000N 1000kgf 2000lbf (Range: 1000 MPa)

Extension measured by: crosshead (Gauge Length 0.2000 in)

Stage 1 speed: 1.00 in/min

Calculate extension: Enabled

Specimen details

	Width in	Thickness in	Area in ²	Range lbf	Utilisation %
Specimen 1	1.9000	0.2000	0.3800	2000	2756
Specimen 2	1.3400	0.2000	0.2680	2000	1944

Specimen results

	Peak Stress MPa	Peak Strain %	Yield Strain %	Yield Stress MPa	Break Force lbf	Break Stress MPa	Break Strain %	PS
Specimen 1	3.937	71.428	48.495	3.892	***	***	***	38.1
Specimen 2	2.555	43.406	43.406	2.555	***	***	***	24.7

Tens Modulus
MPa

Specimen 1	42.750
Specimen 2	39.004

216.98 Force

99.428

31.4

Multi-specimen results

	Peak Stress MPa	Peak Strain %	Yield Strain %	Yield Stress MPa	Break Force lbf	Break Stress MPa	Break Strain %
Average	3.246	57.417	45.950	3.223	***	***	***
Std. dev.	0.977	19.815	3.599	0.946	***	***	***

Tens Modulus
MPa

Average	40.877
Std. dev.	2.649

Ignore highest & lowest results: Disabled

PN#: 33094
 Customer: M K
 Material ID: 065
 Miscellaneous:
 Specimen #: 01

Name: mam
 Test Type: Plastics Testing Division Tensile Tests
 Test Name: ASTM C908
 Test Date: 11-24-98
 Test Time: 13.33.16

Sample 001

Version PV6.05/MV2.06 Test code: 61004

Serial Number: 80SIC1072

Tension General Purpose

Number of Specimens: 1 / 2

Sample type: Type I Specimens

Method used: ASTM D 638-94b

User text:

Loadcell: 10000N 1000kgf 2000lbf (Range: 1000 MPa)

Extension measured by: crosshead (Gauge Length 0.2000 in)

Stage 1 speed: 1.00 in/min

Recalculate extension: Enabled

Specimen details

	Width in	Thickness in	Area in ²	Range lbf	Utilisation %
Specimen 1	2.0350	0.2000	0.4070	2000	2952

6.105

Specimen results

	Peak Stress MPa	Peak Strain %	Yield Strain %	Yield Stress MPa	Break Force lbf	Break Stress MPa	Break Strain %
Specimen 1	2.575	27.430	27.430	2.575	***	***	***

Tens Modulus
MPa

Specimen 1 40.149

138.58 force

23 P.S.

PN#: 34327
CUSTOMER: M K
MATERIAL ID: 48 h
MISC:
1: 01

Name: mm
Test Type: Plastics Testing Division Tensile Tests
Test Name: ASTM D 905
Test Date: 12-07-98
Test Time: 21.48.28

Sample 002

Version PV6.05/MV2.06 Test code: 61004
Serial Number: 80SIC1059
Tension General Purpose
Number of Specimens: 2
Sample type: Type I Specimens
Method used: ASTM D 638-94b
User text: mam
Loadcell: 1000N 100kgf 200lbf (Range: 20000 psi)
Extension measured by: crosshead (Gauge Length 0.1250 in)
Stage 1 speed: 1.00 in/min
Recalculate extension: Enabled

27

Specimen details

	Width in	Thickness in	Area in ²	Range lbf	Utilisation %
Specimen 1	1.5000	0.2000	0.3000	200	3000
Specimen 2	1.3000	0.2000	0.2600	200	2600

4.5
3.5

Specimen results

	Peak Strain %	Peak Strength psi	Yield strain %	Yield stress psi	Break Force lbf	Peak Force lbf	Break Stress psi
Specimen 1	58.428	321.42	58.428	321.42	***	96.4268	***
Specimen 2	71.529	324.85	71.529	324.85	***	84.4614	***
	Break Strain %	Tens Modulus psi					
Specimen 1	***	2441.7					
Specimen 2	***	2833.0					

21.55 Ave

Multi-specimen results

	Peak Strain %	Peak Strength psi	Yield strain %	Yield stress psi	Break Force lbf	Peak Force lbf	Break Stress psi
Average	64.978	323.14	64.978	323.14	***	90.4441	***
Std. dev.	9.263	2.424	9.263	2.424	***	8.46085	***
	Break Strain %	Tens Modulus psi					
Average	***	2637.3					
Std. dev.	***	276.71					

Ignore highest & lowest results: Disabled



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DRAFT

Page 1 of 1, PN# 34327

December 8, 1998

Mr. Mel Auerbach
M & K Associates
10242 Dayflower Drive
Twinsburgh, OH 44087

28

SUBJECT: Mixing Rubber compounds and testing physical properties.

RECEIVED: Samples for rubber mixing and compounding.

TEST METHODOLOGY:

TENSILE STRENGTH ASTM C908

Speed: 1.0 in/min Gauge Length: 0.20 inches

RESULTS:

TENSILE STRENGTH C908

<u>Sample I.D.</u>	<u>Results, psi</u>
8433 (24 hours)	19.10
8433 (48 hours)	21.61

TENSILE STRENGTH C908

<u>Sample I.D.</u>	<u>Results, psi</u>
8433 (192 hours)	27.33

Melissa A. Martin
Project Technician
AKRON RUBBER DEVELOPMENT LABORATORY, INC.
PN# 34327 INV# 73432701

Barbara J. Gedeon
Manager - Plastics Testing Division

*** Transmission Result Report (Dec. 14. 1998 2:03PM) ***

T T I

File	Mode	Option	Address (Group)	Result	Page
9730	IMM_TX		2169630479	OK	P. 2

Reason for Error

- 1) Hang up or line fail
- 3) No answer

2) Busy

- 4) No facsimile connection

PN#: 34327
CUSTOMER: m k
MATERIAL ID: 2 weeks
MISC: 8344 2
1: 01

Name: mm
Test Type: Plastics Testing Division Tensile Tests
Test Name: ASTM D 905
Test Date: 12-30-98
Test Time: 13.32.52

Sample 003

Version PV6.05/MV2.06 Test code: 61004
Serial Number: 80SIC1059
Tension General Purpose
Number of Specimens: 2
Sample type: Type I Specimens
Method used: ASTM D 638-94b
User text: mam
Loadcell: 1000N 100kgf 200lbf (Range: 20000 psi)
Extension measured by: crosshead (Gauge Length 0.1250 in)
Stage 1 speed: 1.00 in/min
Recalculate extension: Enabled

Specimen details

	Width in	Thickness in	Area in ²	Range lbf	Utilisation %
Specimen 1	1.5100	0.2000	0.3020	200	3020
Specimen 2	1.4000	0.2000	0.2800	200	2800

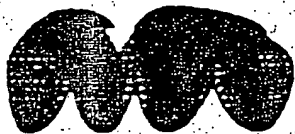
Specimen results

	Peak Strain %	Peak Strength psi	Yield strain %	Yield stress psi	Break Force lbf	Peak Force lbf	Break Stress psi
Specimen 1	132.47	461.97	67.039	420.39	***.***	139.514	***.***
Specimen 2	72.119	395.43	72.119	395.43	***.***	110.719	***.***
	Break Strain %	Tens Modulus psi					
Specimen 1	***.***	2147.5					
Specimen 2	***.***	2289.3					

Multi-specimen results

	Peak Strain %	Peak Strength psi	Yield strain %	Yield stress psi	Break Force lbf	Peak Force lbf	Break Stress psi
Average	102.30	428.70	69.579	407.91	***.***	125.116	***.***
Std. dev.	42.676	47.052	3.592	17.655	***.***	20.3610	***.***
	Break Strain %	Tens Modulus psi					
Average	***.***	2218.4					
Std. dev.	***.***	100.26					

Ignore highest & lowest results: Disabled



M&K ASSOCIATES, INC.
10242 Dayflower Drive
Twinsburg, OH 44087
Telephone: 330-963-5467
Facsimile: 330-963-0479
E-Mail: carmmel@aol.com

TO: Scott Yates

COMPANY: ARDL

FAX NUMBER: 330 ~~963~~ 794 6610

DATE: 1/8/99

FROM: Mel Auerbach

CC:

☒ URGENT ☐ REPLY ASAP ☒ REVIEW/COMMENT ☒ FOR YOUR INFORMATION

TOTAL PAGES, INCLUDING COVER: 1

Scott

Here are the raw materials and quantities needed to make
two batches. If possible, get more material to have on hand.

Mastabatch - 5.56 lbs	}	Acetylene Black - 1.00 lb
Pentolyn G - 0.71 lbs		Molecular Sieve 3A - 1.33 lbs
Pentolyn H - 0.36 lbs		Molecular Sieve 13X - 0.48 lbs
Escoxy 1315 - 2.86 lbs		Zinc Oxide - 0.05 lbs
Surpa 2250 - 1.93 lbs		

If you have any questions, please advise

Regards,

Mel Auerbach

1/11/99

To: Mel Auerbach, M & K Associates

From: Scott Yates, ARDL, Inc.

Mel.

Following is a list of the raw materials we have on hand. For the materials that we need more of, I still have a list of the contacts I used to obtain these original samples and would be glad to order more as necessary. Correct me if I am wrong, but I understand that this round of mixing will be on the 8433 sample only? Please advise. Call me after you have reviewed this list.

Sincerely,

Scott



Raw Material	Wgt Req'd	Wgt "on-hand"
Masterbatch(8433)	5.56 lbs	3.88 lbs
Pentalyn G	0.71 lbs	1.04 lbs
Pentalyn H	0.36 lbs	1.02 lbs
Escorez 1315	2.86 lbs	3.72 lbs
Sunpar 2280	1.93 lbs	*
Acetylene Black	1.0 lbs	24 lbs(bag)
Molecular Sieve 3A	1.33 lbs	0.42 lbs
Molecular Sieve 13X	0.48 lbs	0.44 lbs
Zinc Oxide	0.05 lbs	0.62 lbs

* We can get plenty of Sunpar oil from our Kenmore facility

T T I

File	Mode	Option	Address (Group)	Result	Page
0446	IMM_TX		2169630479	OK	P. 1

Reason for Error

- 1) Hang up or line fall
- 3) No answer

- 2) Busy
- 4) No facsimile connection

N 330 CARBON

~~BUTA~~

POLY BUTENE -



8433

BATCH SIZE

POLY BUTENE - 156gm

N 330 CARBON - 466gm

BUTYL - 420gm

1042 gm

2.28lbs

M & K Associates

Materials And Quantities Needed to Make 2 Batches

		ON HAND 1/11/99
Masterbatch	5.56 lbs	8433 - 3.8 lbs
Pentalyn G	0.71 lbs	1.04 lbs
Pentalyn H	0.36 lbs	1.0 lbs
Escorez 1315	2.86 lbs	3.7 lbs
Sunpar 2280	1.93 lbs	
Acetylene Black	1.0 lbs	
Molecular Sieve 3A	1.33 lbs	421 lb
Molecular Sieve 13X	0.48 lbs	44 lb
Zinc Oxide	0.05 lbs	



PN#: 34327
Customer: M K
Material ID: 8433
Miscellaneous:
Specimen #: 01

Name: mam
Test Type: tear
Test Name: TEAR DIE C 2 in/min
Test Date: 01-19-99
Test Time: 09.15.48

Sample 002

Version PV6.05/MV2.06 Test code: 61006
Serial Number: 80SIC1072
Tear General Purpose
Number of Specimens: 2 / 5
Sample type: trouser
Method used:
Loadcell: 1000N 100kgf 200lbf (Range: 500 N)
Extension measured by: crosshead
Stage 1 speed: 2.00 in/min
Peak force threshold: 9.78608 N, Trough force threshold: 9.78608 N
Analyse all of X-range

Specimen details

	Thickness in	Range N	Utilisation %
Specimen 1	0.1250	500	50.00
Specimen 2	0.1250	500	50.00

Specimen results

	TEAR STRENGTH N/m	TEAR FORCE N
Specimen 1	24869	78.96
Specimen 2	23716	75.298

17.75
16.93

17.34

Multi-specimen results

	TEAR STRENGTH N/m	TEAR FORCE N
Median	24293	77.129
Average	24293	77.129
Range	1153	3.662

Ignore highest & lowest results: Disabled

To: Barbara Gesson
 From: Mel Aurbach
 FAX Nbr: 330-794-6610

1/19/99

	<u>1</u>	<u>2</u>	<u>3</u>
Masterbatch 065	140.1		
Masterbatch 8433	—	140.1	140.1
Pentelyn G	18.0	18.0	18.0
Pentelyn H	9.0	9.0	9.0
Escorez 1315	72.0	72.0	72.0
Seipen 2280	48.6	48.6	48.6
Acetylene Black	25.2	25.2	25.2
Molecular Sieve 3A	33.6	33.6	33.6
Molecular Sieve 13X	12.0	12.0	12.0
Silane A1120?	1.8	—	1.8
Zinc Oxide	—	1.2	1.2

Follow same procedure

1/19/99



To: Barbara Gedson

From: Mel Aurbach

FAX NBR: 330-794-6610

56.8 lbs #A 8-43

	<u>1</u>	<u>2</u>	<u>3</u>
Masterbatch 065	140.1	140.1	140.1
Masterbatch 8433	—	—	—
Pentalyn G	18.0	18.0	18.0
Pentalyn H	9.0	9.0	9.0
Escorez 1315	72.0	72.0	72.0
Surper 2280	48.6	48.6	48.6
Acetylene Black	25.2	25.2	25.2
Molecular Sieve 3A	33.6	33.6	33.6
Molecular Sieve 13X	12.0	12.0	12.0
Silane A1120?	1.8	—	1.8
Zinc Oxide	—	1.2	1.2
	<u>360.3</u>		

Mel -
Mel -
Order

Follow same procedure

3/3/99

Mix + Time procedure as the same; run experiments 3/10/99

4) same as # 2 but 3.6 gm of Zinc Stearate
no Zinc Oxide mix 10-15 min @ 200°F

5) same as # 3 but ^{0.5 g} Silane &
no Zinc Oxide; mix @ 10-15 min @ 200°F

→ 1/4" x 1" x 3" dies

- Lap Shear @ 24 hours
and 7 days & 14 days

- make up samples day before & continue

6) will be Silane + Zinc Stearate

Silane A1120
50 parts / rubber
need less Silane

April 22, 1999

SUBJECT: Mixing Rubber compounds and testing physical properties.

RECEIVED: Samples for rubber mixing and compounding.

TEST METHODOLOGY:

LAP SHEAR STRENGTH OF HOT APPLIED SEALANT ASTM C961-97

Speed: 0.5 in/min

Sample prep: Applied a 1"by 1 inch sample to one side of the substrate surface then compressed a second substrate onto the sample to a thickness of 1/8".

RESULTS:

LAP SHEAR STRENGTH C961(48 hours)

Sample I.D.	Results, N/m ² (psi)
Compound #1	53858 (7.81)
Compound #2	61474 (8.92)
Compound #3	170619 (24.75)

LAP SHEAR STRENGTH C961(168 hours)

<u>Sample I.D.</u>	<u>Results, N/m²(psi)</u>
Compound #1	55910 (8.11)
Compound #2	53338 (7.74)
Compound #3	93976 (13.63)

LAP SHEAR STRENGTH C961(864 hours)

Sample I.D.	Results, N/m ² (psi)
Compound #1	59261 (8.60)
Compound #2	60978 (8.84)

LAP SHEAR STRENGTH C961(1048 hours)

Both Samples were preheated @ 150 °F for one hour then compressed to a thickness of 0.1250 inches.
Each sample was conditioned for 24 hours before testing.

Sample I.D.	Results, N/m ² (psi)
Compound #2	86668 (12.57)
*Compound #3	100739 (14.61)

*Compound #2 had a cohesive failure and Compound #3 had an adhesive failure.

LAP SHEAR STRENGTH C961(24 hours)

Sample I.D.	Results, N/m ² (psi)
Compound #4	69312 (10.05)
Compound #5	78205 (11.34)

*Compound #4 and #5 had cohesive failure.

LAP SHEAR STRENGTH C961(13 days)

Sample I.D.	Results, N/m ² (psi)
Compound #4	64754 (9.39)
Compound #5	56546 (8.20)

*Compound #4 and #5 had cohesive failure

LAP SHEAR STRENGTH C961

Sample I.D.	Results, N/m ² (psi)
Compound #5 (Old)	64706 (9.38)
*Compound #5 with 0.5g silane (New)	67293 (9.76)

* This was tested 24 hours after mixing.

Compound #5 (Old) and #5 (New) had cohesive failure.

LAP SHEAR STRENGTH C961 (168 hours) Cohesive Failure

Sample I.D.	Results, N/m ² (psi)
Compound #5 (New) + 20g of 10g Silane	92390 (13.40)

LAP SHEAR STRENGTH C961 (336 hours) Cohesive Failure

Sample I.D.	Results, N/m ² (psi)
Compound #5 (New)	90889 (13.14)

Melissa A. Martin
Project Technician
AKRON RUBBER DEVELOPMENT LABORATORY, INC.
PN# 34327G INV# 734327G01

Barbara J. Gedeon
Manager - Plastics Testing Division



1/19/99

To: Barbara Gedson

From: Mel Aulisch

FAX Nbr: 330-794-6610

56.8 lbs XP 8433

Masterbatch 065
 Masterbatch 8433
 Pentolyn G
 Pentolyn H
 Escorez 1315
 Tempel 2280
 Acetylene Black
 Molecular Sieve 3A
 Molecular Sieve 13X
 Silane A1120?
 Zinc Oxide
 Zinc Stearate

#4	#5
140.1	140.1
18.0	18.0
9.0	9.0
72.0	72.0
48.6	48.6
25.2	25.2
33.6	33.6
12.0	12.0
-	0.5 grams
3.6	-

Follow same procedure - Mix + Time

130-150

- 4) Same as #2 3.6 grams Zinc Stearate NO Zinc Oxide
- 5) Same as #3 ~~No~~ Silane ^{to 0.5 grams} NO Zinc Oxide

Lap Shear @ 24 hours

make days 6 test 7 days ~~test~~

make days 13 test 14 days

6) Mix to follow Silane + Zinc Stearate

7) Retest #2 + #3 heating to ~~130~~ - 150 °F
 Note cohesive or adhesive failure

a) 1.11 + 1.110 means

pulls away from mass

Silane A1120
 50 parts / rubber
 need less than

Page 1 of 1, PN# 34327A

January 28, 1999

Mr. Mel Auerbach
M & K Associates
10242 Dayflower Drive
Twinsburgh, OH 44087

SUBJECT: Mixing Rubber compounds and testing physical properties.

RECEIVED: Samples for rubber mixing and compounding.

TEST METHODOLOGY:

LAP SHEAR STRENGTH OF HOT APPLIED SEALANT ASTM C961-97

Speed: 2.0 in/min

Sample prep: Applied a 1 by 1 inch sample to one side of the substrate surface then compressed a second substrate onto the sample to a thickness of 1/8".

RESULTS:

LAP SHEAR STRENGTH C961

<u>Sample I.D.</u>	<u>Results, N/m²(psi)</u>
Compound #1	53858 (7.81)
Compound #2	61474 (8.92)
Compound #3	170619 (24.746)



Melissa A. Martin
Project Technician
AKRON RUBBER DEVELOPMENT LABORATORY, INC.
PN# 34327A INV# 73432701

Barbara J. Gedeon
Manager - Plastics Testing Division

TO: Mel Auerbach
FROM: Scott Yates
RE: Invoice from 1/29/99

Mel,

Following is an itemization of work performed by ARDL that you were billed for.
If you have any questions, please call.

Item 1: 4 mixes on Haake Mixer @ \$100.00
3 mixes of 065 Masterbatch with various amounts of Silane/ ZnO
1 mix of 8433 Masterbatch

Item 2: 10 Lap Shear (adhesion) Tests on same compounds (includes sample
preparation.) 10 tests @ \$125.00

Item 3: Various glass plates ordered from McMaster/Carr to perform testing:
\$202.76

Item 4: \$400.00 - mixing
\$1250.00 - lap shear testing
\$202.76 - supplies

Total \$1852.76

Mel,

Please look this over and call me with any questions. I believe these mixes were run back in late December and early January. I was told to charge the glass plates against your project when we received our invoice from McMaster/Carr. Please call if necessary.

Scott

*** Transmission Result Report (Mar. 16. 1999 2:55PM) ***

T T I

File	Mode	Option	Address (Group)	Result	Page
2869	IMM_TX		2169630479	OK	P. 1

Reason for Error

- 1) Hang up or line fail
- 3) No answer

- 2) Busy
- 4) No facsimile connection

PN#: 34327
Customer: M K
Material ID: 1
Miscellaneous:
Specimen #: 01

Name: big
Test Type: tear
Test Name: TEAR DIE C .5 in min
Test Date: 01-29-99
Test Time: 13.53.49

Sample 001

Version PV6.05/MV2.06 Test code: 61006
Serial Number: 80SIC1072
Tear General Purpose
Number of Specimens: 2 / 5
Sample type: trouser
Method used:
Loadcell: 1000N 100kgf 200lbf (Range: 500 N)
Extension measured by: crosshead
Stage 1 speed: 0.50 in/min
Peak force threshold: 9.78608 N, Trough force threshold: 9.78608 N
Analyse all of X-range

Specimen details

	Thickness in	Range N	Utilisation %
Specimen 1	0.1235	500	50.00
Specimen 2	0.1360	500	50.00

Specimen results

	TEAR STRENGTH N/m	TEAR FORCE N
Specimen 1	11653	36.554
Specimen 2	9535	32.938

lbs. $N/m^2 \times 6894.8$
 $\div 4.4482$
 8.218
 7.405
 56641
 51056

Multi-specimen results

	TEAR STRENGTH N/m	TEAR FORCE N
Median	10594	34.746
Average	10594	34.746
Range	2118	3.616

Ignore highest & lowest results: Disabled

36

PN#: 34327
Customer: M K
Material ID: 5
Miscellaneous:
Specimen #: 01

Name: mam
Test Type: tear
Test Name: TEAR DIE C .5 in min
Test Date: 03-11-99
Test Time: 14.03.29

Sample 002

Version PV6.05/MV2.06
Serial Number: 80SIC1072
Tear General Purpose
Number of Specimens: 2 / 5
Sample type: trouser
Method used:
Loadcell: 1000N 100kgf 200lbf (Range: 500 N)
Extension measured by: crosshead
Stage 1 speed: 0.50 in/min
Peak force threshold: 9.78608 N, Trough force threshold: 9.78608 N
Analyse all of X-range

Test code: 61006

Specimen details

	Thickness in	Range N	Utilisation %
Specimen 1	0.1345	500	50.00
Specimen 2	0.1750	500	50.00

Specimen results

	TEAR STRENGTH N/m	TEAR FORCE N
Specimen 1	15079	51.515
Specimen 2	11112	49.394

Multi-specimen results

	TEAR STRENGTH N/m	TEAR FORCE N
Median	13096	50.4545
Average	13096	50.4545
Range	3967	2.121

11.34

78,205

Ignore highest & lowest results: Disabled



PN#: 34237
Customer: MK
Material ID: 4
Miscellaneous: 13 days
Specimen #: 01

Name: mam
Test Type: tear
Test Name: TEAR DIE C .5 in min
Test Date: 03-24-99
Test Time: 12.41.07

Sample 001

Version PV6.05/MV2.06 Test code: 61006
Serial Number: 80SIC1072
Tear General Purpose
Number of Specimens: 2 / 5
Sample type: trouser
Method used:
Loadcell: 1000N 100kgf 200lbf (Range: 500 N)
Extension measured by: crosshead
Stage 1 speed: 0.50 in/min
Peak force threshold: 9.78608 N, Trough force threshold: 9.78608 N
Analyse all of X-range

Specimen details

	Thickness in	Range N	Utilisation %
Specimen 1	0.1545	500	50.00
Specimen 2	0.1530	500	50.00

Specimen results

	TEAR STRENGTH N/m	TEAR FORCE N
Specimen 1	12246	48.055
Specimen 2	9134	35.497

Multi-specimen results

	TEAR STRENGTH N/m	TEAR FORCE N
Median	10690	41.776
Average	10690	41.776
Range	3111	12.558

9.39

64754

Ignore highest & lowest results: Disabled



"More Than Testing, We Care"



FAX TRANSMISSION

AKRON RUBBER DEVELOPMENT LABORATORY, INC.

2887 Gilchrist Road • Akron, Ohio 44305

1-800-830-ARDL • (330) 794-6600 • FAX (330) 794-6610

Date: 3-24-99

To: mel

From: Melissa

Company: M&K

No. of Pages (including this page): 3

U.S. Fax No.: () 963 - 0479

Overseas Fax No.: 9-011-_____

COMMENTS: _____

Mel,

I'm leaving for school. You can leave
me a voice message concerning the next
step. Otherwise, I can call you first
thing tomorrow morning.

Sincerely

This facsimile contains confidential information intended only for the use of the addressee(s). If the reader of the facsimile is not the intended recipient or the employee or agent responsible for delivering it to the intended recipient, you are hereby notified that any dissemination or copying of this facsimile is strictly prohibited. If you have received this facsimile in error, please immediately notify us by return fax at 330-794-6610 and return the original facsimile to us at 2887 Gilchrist Road, Akron, Ohio 44305 via the U.S. Postal Service, costs of which will be reimbursed to you. Thank you.

Page 1 of 1, PN# 34327D

March 23, 1999

Mr. Mel Auerbach
M & K Associates
10242 Dayflower Drive
Twinsburgh, OH 44087

SUBJECT: Mixing Rubber compounds and testing physical properties.

RECEIVED: Samples for rubber mixing and compounding.

TEST METHODOLOGY:

LAP SHEAR STRENGTH OF HOT APPLIED SEALANT ASTM C961-97

Speed: 0.5 in/min

Sample prep: Applied a 1 by 1 inch sample to one side of the substrate surface then compressed a second substrate onto the sample to a thickness of 1/8".

RESULTS:

LAP SHEAR STRENGTH C961(48 hours)

<u>Sample I.D.</u>	<u>Results, N/m²(psi)</u>
Compound #1	53858 (7.81)
Compound #2	61474 (8.92)
Compound #3	170619 (24.75)

LAP SHEAR STRENGTH C961(168 hours)

<u>Sample I.D.</u>	<u>Results, N/m²(psi)</u>
Compound #1	55910 (8.11)
Compound #2	53338 (7.74)
Compound #3	93976 (13.63)

LAP SHEAR STRENGTH C961(864 hours)

<u>Sample I.D.</u>	<u>Results, N/m²(psi)</u>
Compound #1	59261 (8.60)
Compound #2	60978 (8.84)

LAP SHEAR STRENGTH C961(1048 hours)

Both Samples were preheated @ 150 °F for one hour then compressed to a thickness of 0.1250 inches. Each sample was conditioned for 24 hours before testing.

<u>Sample I.D.</u>	<u>Results, N/m²(psi)</u>
Compound #2	86668 (12.57)
*Compound #3	100739 (14.61)

*Compound #2 had a cohesive failure and Compound #3 had an adhesive failure.

LAP SHEAR STRENGTH C961(24 hours)

<u>Sample I.D.</u>	<u>Results, N/m²(psi)</u>
Compound #4	69312 (10.05)
Compound #5	78205 (11.34)

*Compound #4 and #5 had cohesive failure.

LAP SHEAR STRENGTH C961(13 days)

<u>Sample I.D.</u>	<u>Results, N/m²(psi)</u>
Compound #4	64754 (9.39)
Compound #5	56546 (8.20)

*Compound #4 and #5 had cohesive failure

Melissa A. Martin
Project Technician
AKRON RUBBER DEVELOPMENT LABORATORY, INC.
PN# 34327D INV# 734327D01

Barbara J. Gedeon
Manager - Plastics Testing Division

*** Transmission Result Report (Mar. 24. 1999 4:40PM) ***

T T I

File	Mode	Option	Address (Group)	Result	Page
3256	IMM_TX		2169630479	OK	P. 3

Reason for Error

- 1) Hang up or line fail
- 3) No answer

2) Busy

- 4) No facsimile connection

~~Hoover will donate upright~~

4/5/99

~~24 hour, - 14 days~~

Mel Auerbach & MHA Assoc.
Compound #5 put back in
mixer heat to 200°F
add 0.5 grams Silane
mix 10-15 minutes + the
do 24 hour lap shear

4/5/99

~~Mike Renkert
Bayer project going for~~

~~Call Multibase again~~


~~Marla Elliot~~

~~FAX 610-286-6531~~



AKRON RUBBER DEVELOPMENT LABORATORY, INC.
2887 Gilchrist Road • Akron, Ohio 44305
1-800-830-ARDL • (330) 794-6600 • FAX (330) 794-6610

Overseas Fax No.: 9-011-_____



FAX.mas/01/20/97

Page 1 of 1, PN# 34327E

April 8, 1999

Mr. Mel Auerbach
M & K Associates
10242 Dayflower Drive
Twinsburgh, OH 44087

SUBJECT: Mixing Rubber compounds and testing physical properties.

RECEIVED: Samples for rubber mixing and compounding.

TEST METHODOLOGY:

LAP SHEAR STRENGTH OF HOT APPLIED SEALANT ASTM C961-97

Speed: 0.5 in/min

Sample prep: Applied a 1 by 1 inch sample to one side of the substrate surface then compressed a second substrate onto the sample to a thickness of 1/8".

RESULTS:

LAP SHEAR STRENGTH C961(48 hours)

<u>Sample I.D.</u>	<u>Results, N/m²(psi)</u>
Compound #1	53858 (7.81)
Compound #2	61474 (8.92)
Compound #3	170619 (24.75)

LAP SHEAR STRENGTH C961(168 hours)

<u>Sample I.D.</u>	<u>Results, N/m²(psi)</u>
Compound #1	55910 (8.11)
Compound #2	53338 (7.74)
Compound #3	93976 (13.63)

LAP SHEAR STRENGTH C961(864 hours)

<u>Sample I.D.</u>	<u>Results, N/m²(psi)</u>
Compound #1	59261 (8.60)
Compound #2	60978 (8.84)

LAP SHEAR STRENGTH C961(1048 hours)

Both Samples were preheated @ 150 °F for one hour then compressed to a thickness of 0.1250 inches. Each sample was conditioned for 24 hours before testing.

Sample I.D.	Results, N/m ² (psi)
Compound #2	86668 (12.57)
*Compound #3	100739 (14.61)

*Compound #2 had a cohesive failure and Compound #3 had an adhesive failure.

LAP SHEAR STRENGTH C961(24 hours)

Sample I.D.	Results, N/m ² (psi)
Compound #4	69312 (10.05)
Compound #5	78205 (11.34)

*Compound #4 and #5 had cohesive failure.

LAP SHEAR STRENGTH C961(13 days)

Sample I.D.	Results, N/m ² (psi)
Compound #4	64754 (9.39)
Compound #5	56546 (8.20)

*Compound #4 and #5 had cohesive failure

LAP SHEAR STRENGTH C961)

Sample I.D.	Results, N/m ² (psi)
Compound #5 (Old)	64706 (9.38)
*Compound #5 with 0.5g silane (New)	67293 (9.76)

* This was tested 24 hours after mixing.

Compound #5 (Old) and #5 (New) had cohesive failure.

Melissa A. Martin
Project Technician
AKRON RUBBER DEVELOPMENT LABORATORY, INC.
PN# 34327E INV# 734327E01

Barbara J. Gedeon
Manager - Plastics Testing Division

72

DRAFT

Page 1 of 1, PN# 34327F

April 15, 1999

Mr. Mel Auerbach
M & K Associates
10242 Dayflower Drive
Twinsburgh, OH 44087

SUBJECT: Mixing Rubber compounds and testing physical properties.

RECEIVED: Samples for rubber mixing and compounding.

TEST METHODOLOGY:

LAP SHEAR STRENGTH OF HOT APPLIED SEALANT ASTM C961-97

Speed: 0.5 in/min

Sample prep: Applied a 1 by 1 inch sample to one side of the substrate surface then compressed a second substrate onto the sample to a thickness of 1/8".

RESULTS:

LAP SHEAR STRENGTH C961(48 hours)

<u>Sample I.D.</u>	<u>Results, N/m²(psi)</u>
Compound #1	53858 (7.81)
Compound #2	61474 (8.92)
Compound #3	170619 (24.75)

LAP SHEAR STRENGTH C961(168 hours)

<u>Sample I.D.</u>	<u>Results, N/m²(psi)</u>
Compound #1	55910 (8.11)
Compound #2	53338 (7.74)
Compound #3	93976 (13.63)

LAP SHEAR STRENGTH C961(864 hours)

<u>Sample I.D.</u>	<u>Results, N/m²(psi)</u>
Compound #1	59261 (8.60)
Compound #2	60978 (8.84)

LAP SHEAR STRENGTH C961(1048 hours)

Both Samples were preheated @ 150 °F for one hour then compressed to a thickness of 0.1250 inches. Each sample was conditioned for 24 hours before testing.

<u>Sample I.D.</u>	<u>Results, N/m²(psi)</u>
Compound #2	86668 (12.57)
*Compound #3	100739 (14.61)

*Compound #2 had a cohesive failure and Compound #3 had an adhesive failure.

LAP SHEAR STRENGTH C961(24 hours)

<u>Sample I.D.</u>	<u>Results, N/m²(psi)</u>
Compound #4	69312 (10.05)
Compound #5	78205 (11.34)

*Compound #4 and #5 had cohesive failure.

LAP SHEAR STRENGTH C961(13 days)

<u>Sample I.D.</u>	<u>Results, N/m²(psi)</u>
Compound #4	64754 (9.39)
Compound #5	56546 (8.20)

*Compound #4 and #5 had cohesive failure.

LAP SHEAR STRENGTH C961)

<u>Sample I.D.</u>	<u>Results, N/m²(psi)</u>
Compound #5 (Old)	64706 (9.38)
*Compound #5 with 0.5g silane (New)	67293 (9.76)

* This was tested 24 hours after mixing.

Compound #5 (Old) and #5 (New) had cohesive failure.

LAP SHEAR STRENGTH C961)

<u>Sample I.D.</u>	<u>Results, N/m²(psi)</u>
Compound #5 (New)	92390 (13.40)

Melissa A. Martin
Project Technician
AKRON RUBBER DEVELOPMENT LABORATORY, INC.
PN# 34327F INV# 734327F01

Barbara J. Gedeon
Manager - Plastics Testing Division

*** Transmission Result Report (Apr. 15. 1999 2:17PM) ***

T T I

File	Mode	Option	Address (Group)	Result	Page
4304	IMM_TX		2169630479	OK	P. 2

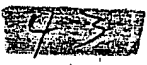
Reason for Error

1) Hang up or line fail
3) No answer

2) Busy
4) No facsimile connection

PN#: 34327
Customer: MK
Material ID: WEEK
Miscellaneous: NEW 5
Specimen #: 01

Name: njl
Test Type: tear
Test Name: TEAR DIE C .5 in min
Test Date: 04-15-99
Test Time: 09.22.06



Sample 001

Version PV6.05/MV2.06 Test code: 61006
Serial Number: 80SIC1072
Tear General Purpose
Number of Specimens: 2 / 5
Sample type: trouser
Method used:
Loadcell: 1000N 100kgf 200lbf (Range: 500 N)
Extension measured by: crosshead
Stage 1 speed: 0.50 in/min
Peak force threshold: 9.78608 N, Trough force threshold: 9.78608 N
Analyse all of X-range

Specimen details

	Thickness in	Range N	Utilisation %
Specimen 1	0.2045	500	50.00
Specimen 2	0.2205	500	50.00

Specimen results

	TEAR STRENGTH N/m	TEAR FORCE N
Specimen 1	11249	58.429
Specimen 2	10855	60.794

13.14

Multi-specimen results

	TEAR STRENGTH N/m	TEAR FORCE N
Median	11052	59.6115
Average	11052	59.6115
Range	394.0	2.365

13.40

92390

Ignore highest & lowest results: Disabled

Page 1 of 1, PN# 34327G

April 22, 1999

Mr. Mel Auerbach
M & K Associates
10242 Dayflower Drive
Twinsburgh, OH 44087

SUBJECT: Mixing Rubber compounds and testing physical properties.

RECEIVED: Samples for rubber mixing and compounding.

TEST METHODOLOGY:

LAP SHEAR STRENGTH OF HOT APPLIED SEALANT ASTM C961-97

Speed: 0.5 in/min

Sample prep: Applied a 1 by 1 inch sample to one side of the substrate surface then compressed a second substrate onto the sample to a thickness of 1/8".

RESULTS:

LAP SHEAR STRENGTH C961(48 hours)

<u>Sample I.D.</u>	<u>Results, N/m²(psi)</u>
Compound #1	53858 (7.81)
Compound #2	61474 (8.92)
Compound #3	170619 (24.75)

LAP SHEAR STRENGTH C961(168 hours)

<u>Sample I.D.</u>	<u>Results, N/m²(psi)</u>
Compound #1	55910 (8.11)
Compound #2	53338 (7.74)
Compound #3	93976 (13.63)

LAP SHEAR STRENGTH C961(864 hours)

<u>Sample I.D.</u>	<u>Results, N/m²(psi)</u>
Compound #1	59261 (8.60)
Compound #2	60978 (8.84)

LAP SHEAR STRENGTH C961(1048 hours)

Both Samples were preheated @ 150 °F for one hour then compressed to a thickness of 0.1250 inches. Each sample was conditioned for 24 hours before testing.

<u>Sample I.D.</u>	<u>Results, N/m²(psi)</u>
Compound #2	86668 (12.57)
*Compound #3	100739 (14.61)

*Compound #2 had a cohesive failure and Compound #3 had an adhesive failure.

LAP SHEAR STRENGTH C961(24 hours)

<u>Sample I.D.</u>	<u>Results, N/m²(psi)</u>
Compound #4	69312 (10.05)
Compound #5	78205 (11.34)

*Compound #4 and #5 had cohesive failure.

LAP SHEAR STRENGTH C961(13 days)

<u>Sample I.D.</u>	<u>Results, N/m²(psi)</u>
Compound #4	64754 (9.39)
Compound #5	56546 (8.20)

*Compound #4 and #5 had cohesive failure

LAP SHEAR STRENGTH C961

<u>Sample I.D.</u>	<u>Results, N/m²(psi)</u>
Compound #5 (Old)	64706 (9.38)
*Compound #5 with 0.5g silane (New)	67293 (9.76)

* This was tested 24 hours after mixing.

Compound #5 (Old) and #5 (New) had cohesive failure.

LAP SHEAR STRENGTH C961 (168 hours) Cohesive Failure

<u>Sample I.D.</u>	<u>Results, N/m²(psi)</u>
Compound #5 (New)	92390 (13.40)

LAP SHEAR STRENGTH C961 (336 hours) Cohesive Failure

<u>Sample I.D.</u>	<u>Results, N/m²(psi)</u>
Compound #5 (New)	90889 (13.14)

5/23 ~ 9 PM

Octate - Zn - 2-Ethyl hexanoate
Zn Octanoate -

5/26/99

Gedem, Yates

25g / lap shear -
increase batch size

RM Status

MB "

Available Time - mixing - 1 week
Schedule - extending - 1 week

Adhesive Consultants - secrecy agreement

- 1 gal, 1 gal, 2 gal

- Sigma Mixer, Hated (clean out w/ Natural Gas)

- \$50/hour; available

- cannot extend

- extend @ ARDL \$50/hr : 1 week in advance

- I'll be here

ARDL

- \$140 + 10 / mix or \$50/hr

Larger Batch Size - no

- Bring 8433 to make more MB - what is form
- AC Black, 3A, 13X enough

Mold 0: 1" x 1/4" OK

- increase batch size 10-20%



M&K ASSOCIATES, INC.
10242 Dayflower Drive
Twinsburg OH 44087
Telephone: 330-963-5467
Facsimile: 330-963-0479
E-Mail: carmmal@aol.com

467

4

TO: SCOTT YATES
COMPANY: ARDL
FAX NUMBER: 330-794-6610
DATE: 5/20/99
FROM: Mel Auerbach
CC:

☐ URGENT ☐ REPLY ASAP ☐ REVIEW/COMMENT ☒ FOR YOUR INFORMATION

TOTAL PAGES, INCLUDING COVER: 2

Scott,
Please see attached as per our discussion.

Regards

Mel Auerbach

Scott Yates 5/20/99

We will increase batch size by 20%

	<u>MA 615</u>	<u>MA 616</u>	<u>MA 617</u>	<u>MA 618</u>
Masterbatch 8433	168.1	126.1	84.1	42.0
Masterbatch 065	—	42.0	84.1	126.1
Pentolyn G	21.6	21.6	21.6	21.6
Pentolyn H	10.8	10.8	10.8	10.8
Scorez 1315	86.4	86.4	86.4	86.4
Junper 2280	58.3	58.3	58.3	58.3
Acetylene Black	30.2	30.2	30.2	30.2
Molecular Sieve 3A	40.3	40.3	40.3	40.3
Molecular Sieve 13X	14.4	14.4	14.4	14.4
Lilens 1120	2.2	2.2	2.2	2.2
Zinc Oxide	1.4	1.4	1.4	1.4
Zinc Stearate	—	—	—	—
	433.7g	433.7g	433.8g	433.7g

Any questions, let me know.

See you Monday @ 9AM

Regards

Mel Overbeck

ARDL Invoice Worksheet

5/20/99 2:29:47 PM

DATE MAILED:

PN NUMBER:

36164

Customer Code:

2829

For Customer:

M & K ASSOCIATES

Mr. Mel Auerbach

10242 DAYFLOWER DRIVE

EST \$:

\$1,400.00

TWINSBURG

OH 44087

CUST PO:

To Follow

PHONE 330-963-5467

DATE REC:

5/20/99

FAX 330-963-0479

DEP CODE:

7

BILL TO 10242 DAYFLOWER DRIVE

P/N DATE:

5/20/99

TWINSBURG

OH 44087

DUE DATE:

6/15/99

SUBJECT:

Mixing and Testing of Material supplied to Customers Formulations.

RECEIVED:

Material from PN, Formulation via FAX.

LABORATORY CHARGES

ITEM	DESCRIPTION	DEP	# SAMPLES	STD. \$	\$ CREDIT

RELATED EXPENSES:

ITEM	DESCRIPTION	AMOUNT	\$ AMOUNT

TOTAL LABORATORY CHARGE:

TOTAL EXPENSES

TOTAL INVOICE:

ARDL Invoice Worksheet

12/1/98 10:39:48 AM

PN NUMBER:

34327

Customer Code:

2829

DATE MAILED:

5/21/99

For Customer:

M & K ASSOCIATES

Mr. Mel Auerbach

10242 DAYFLOWER DRIVE

EST \$:

\$500.00

TWINSBURG

OH 44087

CUST PO:

To Follow

PHONE 330-963-5467

DATE REC:

12/1/98

FAX 330-963-0479

DEP CODE:

7

BILL TO 10242 DAYFLOWER DRIVE

P/N DATE:

12/1/98

TWINSBURG

OH 44087

DUE DATE:

12/20/98

SUBJECT:

Mixing and Testing of Swiggle replacement Material. Continuation of PN33094.

RECEIVED:

One recipe and raw ingredients.

LABORATORY CHARGES

ITEM	DESCRIPTION	DEP	# SAMPLES	STD. \$	\$ CREDIT
1	Mixing on Haake Mixer	7	3	300.00	
2	Peel/Adhesion Testing	7	9	1125.00	

RELATED EXPENSES:

ITEM	DESCRIPTION	AMOUNT	\$ AMOUNT

Itemization
 mixing compound #4, #5, #5 with Silane
 Lap Shear #2 + #3 preheated
 #4 + #5 24 hours + 13 days
 #5 with Silane 24 hours, 7 days, 14 days

TOTAL LABORATORY CHARGE:

1425.00

TOTAL EXPENSES

TOTAL INVOICE:

in 1 bill the DNI

Verbal
per Mel

Please Itemize

JUN-26-1999 17:14

BUTYL POLYMERS

281 588 4609 P.01/03

Exxon Chemical Company
Butyl Polymers Americas

- Fax Cover Sheet -

12/16/02

TO: Mel Auerback

Fax: 330-963-0479

FROM: Lori Bussieres
Phone: 281-870-6862
Fax: 281.588.4609

DATE: June 8, 1999

production
code

Pages incl. cover sheet: 3

EXXPRO-3433 who in U?

Attached please find product specification sheets for Exxon®
EXXPRO™ 8433 and Vistanex MM L-80. If you need more information,
please call me at 281-870-6862.

If this transmission was not complete or is unreadable, please contact B.J. Okabayashi
at telephone: 281-870-6364.

IMPORTANT NOTICE FOR RECEIVING FACSIMILE OPERATOR

This facsimile may contain information intended for receipt and use solely by the addressee(s) named above. If you
are not an intended recipient, any disclosure, copying or use of this information is prohibited. If you have received
this facsimile in error, please notify us by telephone at (281) 870-6364 (at our expense) immediately. Thank you.

Kate Johnson - Rem
281-870-60

11/15/02

Jay Dias 281-834-5199 HVTR & low method



VISTANEX® MM POLYISOBUTYLENE

Product Sales Specification

Description

Vistanex is a polyisobutylene. The product has a characteristic specific gravity of 0.92. The product form is white to pale yellow bales.

FDA Compliance

Vistanex® MM polyisobutylene conforms to requirements of FDA regulations 21 CFR 177.1420 (General Regulations) and 21 CFR 172.615 (Chewing Gum Base) pursuant to Exxon Chemical's Interpretation of the regulations.

Product Specifications

Grades		L-80	L-100	L-120	L-140
Molecular weight viscosity average $\times 10^{-6}$		0.80 ± 0.15	1.25 ± 0.18	1.65 ± 0.21	2.11 ± 0.23
Antioxidant (non-staining)	wt%	0.05 ± 0.04	0.05 ± 0.04	0.05 ± 0.04	0.05 ± 0.04
Ash	wt%	0.3 max	0.3 max	0.3 max	0.3 max
Color	Hunter b	4.0 max	4.0 max	4.0 max	4.0 max
Volatiles	wt%	0.3 max	0.3 max	0.3 max	0.3 max

Test Methods

Molecular weight	Exxon test method
Antioxidant	Exxon test method
Ash	Exxon test method
Color	Exxon test method
Volatiles	Exxon test method

Vistanex polyisobutylene is registered in the Toxic Substance Control Act inventory under CAS number 9003-27-4. All ASTM methods shown may be modified by the Exxon laboratory.

October 1994
202-1094-0001-A

Product sales specifications were developed pursuant to Exxon testing and sampling procedures. Procedures available upon request. Specification and/or procedures are subject to change without notice unless otherwise agreed in writing.

To: Melissa Martin 6/10/99

From: Mel Amersbach

Fax Nbr: 330-794-6610

Melissa

The following is the formulation for the 1 gallon run at Adhesive Consultants on 6/14/99.

Masterbatch 8433	656.0 gm (use new material)
Masterbatch 065	656.0 gm (use new material)
Pentalyn G	168.5 gm
Pentalyn H	84.2 gm
Escorez 1315	673.9 gm
Surgon 2280	454.7 gm
Acetylene Black	235.6 gm
Molecular Sieve 3A	314.3 gm
Molecular Sieve 13X	112.3 gm
Silane 1120 A	25.0 gm
Octoate Z (17-19% Solution)	23.4 gm
	<hr/>
	3,403.9 gm

After manufacture roll on the mill at Adhesive Consultants or take to Kenmore and run on the mill. After milling, take a weight of material. We will extrude on 6/15/99.
Run lap shear at 2 day, 8 days, 15 day

M. I. A. L. L.

	MA 615	MA 616	MA 617	MA 618	MA 619	MA 620	MA 621	MA 622	MA 623	MA 624	MA 625
	5/24/99	5/24/99	5/24/99	5/26/99	5/26/99	5/26/99	6/3/99	6/3/99	6/4/99	6/4/99	6/7/99
Masterbatch 8433 MB-1	168.1	128.1	84.1	84.1	84.1	84.1	42	42	84.1	84.1	84.1
Masterbatch 065	0	42	84.1	84.1	84.1	84.1	126.1	126.1	84.1	84.1	84.1
Pentolyn G	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6
Pentolyn H	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8
Escorez 1315	86.4	86.4	86.4	86.4	86.4	86.4	86.4	86.4	86.4	86.4	86.4
Sunpar 2280	58.3	58.3	58.3	58.3	58.3	58.3	58.3	58.3	58.3	58.3	58.3
Acetylene Black	30.2	30.2	30.2	30.2	30.2	30.2	30.2	30.2	30.2	30.2	30.2
Molecular Sieve 3A	40.3	40.3	40.3	40.3	40.3	40.3	40.3	40.3	40.3	40.3	40.3
Molecular Sieve 13X	14.4	14.4	14.4	14.4	14.4	14.4	14.4	14.4	14.4	14.4	14.4
Silane 1120A	2.2	2.2	2.2	2.2	0	2.2	2.2	2.2	3.2	3.2	3.2
Zinc Oxide	1.4	1.4	1.4	0	0	0	1.4	0	1.4	0	0
Zinc Stearate	0	0	0	0	0	0	0	0	0	0	0
Octoate Z(17-19% Soln)	0	0	0	0	2	2	0	2	0	2	3
Octoate Z(Solid)	0	0	0	0	0	0	0	0	0	0	0
Total Weight, gms	433.7	433.7	433.8	432.4	432.2	434.4	433.7	434.3	434.8	435.4	436.4
Lap Shear(psi)(7 days)	16.9	16.58	17.06	12.16	10.72	15.5	14.47	12.19	16.83	20.9	24.19
Lap Shear(psi)(14 days)			14.86			22.1	16.94	14.66	19.83	28.26	27.33
Lap Shear(psi)(21 days)			15.46			19.5					

MA 625A	MA 625B	MA 626
6/11/99	6/11/99	6/15/99
84.1	84.1	439.5
84.1	84.1	439.5
21.6	21.6	112.9
10.8	10.8	56.4
86.4	86.4	451.5
58.3	58.3	304.7
30.2	30.2	157.9
40.3	40.3	210.6
14.4	14.4	75.2
3.2	3.2	16.8
3	0	0
0	3	0
0	0	15.7
0	0	0
436.4	436.4	2280.7
16.89	18.49	19.09
18.11	20.12	29.6

↓

	MA 627	MA 628	MA 629	MA 630	MA 631
	6/22/99	6/22/99	6/22/99	6/23/99	6/23/99
Masterbatch 8433	42	42	84.1	84.1	84.1
Masterbatch LMM-80	126.1	126.1	84.1	84.1	84.1
Pentalyn G	21.6	21.6	21.6	21.6	21.6
Pentalyn H	10.8	10.8	10.8	10.8	10.8
Escoriz 1315	86.4	86.4	86.4	86.4	86.4
Sunpar 2280	58.3	58.3	58.3	58.3	58.3
Acetylene Black	30.2	30.2	30.2	30.2	30.2
Molecular Sieve 3A	40.3	40.3	40.3	40.3	40.3
Molecular Sieve 13X	14.4	14.4	14.4	14.4	14.4
Silane 1120A	3.2	3.2	3.2	3.2	3.2
Zinc Oxide	0	0	0	0	0
Zinc Stearate	0	0	0	0	0
Octoate Z (17-19%)	2	3	2	3	0
Octoate Z (Solid)	0	0	0	0	3
Total Weight	435.4	436.4	435.4	436.4	436.4
Masterbatch 2-2-84	15.85	13.07 c	17.28 c	19.22 c	10.95 c
Lap Shear (psi) 1 day	19.27 c	16.18 c	20.75	22.74	13.54
Lap Shear (psi) 7 day					

11.84 12.84 12.84

	MA 632	MA 633	MA 634	MA 634A	MA 635	MA 636	MA 637	Compat-	MA 638	MA 639	MA 640
	8/30/99	8/30/99	8/30/99	12/10/99	9/22/99	11/29/99	12/12/99	itive	17/00	11/2/00	1/12/00
Masterbatch 8433	84.1	84.1	84.1	Same as	Made MB	84.1	84.1	Material	84.1	84.1	84.1
Masterbatch LMM-80	84.1	84.1	84.1	MA 634 to	8433 in situ	84.1	84.1	Material	84.1	84.1	84.1
Pentafin G	21.6	21.6	21.6	duplicate	did not	21.6	21.6	Material	0	0	0
Pentafin H	10.8	10.8	10.8	results	work well	10.8	10.8		0	0	0
Escorez 1315	86.4	86.4	86.4			86.4	86.4		118.8	118.8	41
Surpar 2280	58.3	58.3	58.3			58.3	58.3		58.3	58.3	58.3
Acetylene Black	30.2	30.2	30.2			0	15.1		0	0	0
Molecular Sieve 3A	40.3	40.3	40.3			40.3	40.3		40.3	40.3	40.3
Molecular Sieve 13X	14.4	14.4	14.4			14.4	14.4		14.4	14.4	14.4
Silane 1120A	3.2	3.2	3.2			5	5		5	5	5
N-330	0	0	0			0	0		15.1	0	0
Misiron Talc	0	0	0			0	0		0	0	77.8
Octoate Z(17-19%)	3	3	3			5	5		5	5	5
Octoate Z(17-19%)											
Total Weight	436.4	438.4	440.2	440.2	440.2	410	425.1		425.1	410	410
DIAMETER A											32
LAP SHEAR 2 dup	17.35 C	27.38 C	38.54 A		8.53 C	18.37 C		10.94 C			
Lap Shear (psi) (7 days)	33.58 C	40.42 C	40.47 A	46.21 C	18.48 C	35.64 C	23.5 C	12.84 C	26.07 C	8.73 C	29.33 A
Lap Shear (psi) (14 days)	37.19 C	71.13 C	83.3 A	74.41			33.31 C	13.24 C		10.86 C	36.02 C
Lap Shear (psi) (21 days)									33.93 C	12.35 A	37.31 C
Lap Shear (psi) (28 days)						53.72 C			35.15 C	13.43 C	43.49 C

MA-1
MA-2

MA

↓
near to
new

MA

↑ Glass
photo

↑
113
113
113

near to opening

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